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Essays on Foreign Reverse Mergers and Bond ETF Mispricing

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ABSTRACT

ESSAYS ON FOREIGN REVERSE MERGERS AND BOND ETF MISPRICING

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This dissertation examines two topics that have attracted significant attention in the financial media, but have received little academic study.

The first essay examines the characteristics and performance of foreign firms that acquire U.S. exchange listings through a reverse merger (RM). Specifically, this study focuses on Chinese companies which have accounted for over 40% of all RMs taking place on U.S. exchanges. Examination of these firms' characteristics and daily returns from 2004-2010 reveals Chinese firms that engage in RMs are private firms not listed in China, motivated by the ability to offer equity-based compensation (which has been illegal in China), seek quick infusions of capital, grow assets in the U.S. very quickly relative to other RMs, and experience significantly better short and long term performance (particularly when using private investment in public equity (PIPES)) compared to benchmarks that include cross-listed Chinese firms (a modified Halter USX CHINA index), the Russell 2000 and reverse mergers that take place between two U.S. firms.

The second essay is a study of the factors that influence Bond ETF premiums/discounts and the ETF Authorized Participant's ability and/or inclination to arbitrage Bond ETF mispricing. Using daily data for every U.S. Bond ETF from their

inception dates through 2010, this study examines each Bond ETF's pricing relative to the net asset value (NAV) of their underlying securities, evaluating the arbitrage system in place to keep the market price close to their NAV and analyzing the factors that drive the premium/discount. Results find transaction costs, liquidity, fund flows, momentum, market volatility and market sentiment to be statistically significant factors driving pricing. However, there are significant unexplained average premiums for all Bond ETF fund sectors other than U.S. Treasuries for the period 2002 through 2010.

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Next, I thank Dr. Scott Gibson, my M.B.A. finance professor of the College of William and Mary. Scott was my inspiration to pursue my Ph.D. in finance and my mentor all along the way. He led me to the study of Bond ETF mispricing and showed me that one can be both an excellent instructor and scholar.

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Finally, I would like to dedicate this dissertation to my wife Dawn and my mother. Nothing would have been possible without their unconditional love and support.

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CHAPTER 1

INTRODUCTION

A "reverse merger" (RM), often termed a "reverse takeover", allows a private firm to acquire a publicly traded firm to obtain their exchange listing. RMs have significantly outnumbered IPOs as a mechanism for going public in the United States (U.S.) since 2002. In the period 2008 through 2010, foreign firms entering the U.S. have accounted for over 40% of RMs taking place on U.S. exchanges, as compared to approximately 9% of all cross listings and 6% of all IPOs during the same period. This is the first study focused on the foreign companies that come to the U.S. through a reverse merger. In particular, this paper focuses on Chinese RMs, which have attracted significant attention in the financial media, and have accounted for over 63% of reverse mergers into the U.S. since 2008. This paper analyzes Chinese RMs firms' characteristics and relative operating performance for 2 years prior to coming to the U.S. and up to 4 years after being listed on a U.S. stock exchange from 2004-2010. Results show, on average, that Chinese firms that engage in RMs are private firms not listed in China, motivated by the ability to offer equity based compensation (which has been illegal in China), seek quick infusions of capital, grow assets in the U.S. very quickly relative to U.S. RMs, and experience significantly better short and long term performance (particularly when using PIPES) when compared to benchmarks that include cross-listed Chinese firms (a modified Halter USX CHINA index), the Russell 2000 and U.S. RMs.

Since being introduced in the 2002, fixed income (Bond) exchange traded funds (ETFs) have become an important asset class, yet they have garnered little academic study. To date, there has not been a complete study of the factors that influence Bond ETF premiums/discounts or the ETF Authorized Participants ability and/or inclination to arbitrage Bond ETF mispricing. Since 2008's financial breakdown, the financial media has highlighted the fact that Bond ETFs are not the safe havens investors may think. Arbitrage mechanisms seem to have been failing with many Bond ETFs experiencing significant premiums and discounts. Using daily data for every U.S. Bond ETF from their inception dates through 2010, this essay examines their pricing relative to the net asset value (NAV) of their underlying securities, evaluating the arbitrage system in place to keep the market price close to their NAV and analyzing the factors that drive the premium/discount. Results find transaction costs, liquidity, fund flows, momentum, market volatility and market sentiment to be statistically significant factors driving pricing. However, there are significant unexplained average premiums for all Bond ETF fund sectors other than U.S. Treasuries for the period 2002 through 2010. These large and varied premiums may create significant trading costs for investors.

CHAPTER 2

BACKING INTO THE U.S.: A STUDY OF FOREIGN REVERSE MERGERS

2.1 INTRODUCTION

Reverse mergers (RMs) have significantly outnumbered IPOs as a mechanism for going public in the United States since 2002 (Alpert, 2010). In the period January 1, 2008 through December 31, 2010, foreign firms entering the U.S. have accounted for over 40% of RMs taking place on U.S. exchanges (PrivateRaise, 2011). There has been surprisingly little academic study of RMs since their dramatic increase in numbers over recent years. To my knowledge, there has been no study of the foreign firms that use RMs as a mechanism for going public in the U.S.. I believe this topic is worthwhile given the rapid increase in popularity of reverse mergers and the growing interest in foreign market investment.

The focus of this paper is on Chinese firms that represent the vast majority of the foreign RMs which have taken place in the U.S.. As Figure 2.1 depicts, 442 Chinese RMs were consummated during the period of 2004 - 2010, representing over $50 billion in combined capitalization (PrivateRaise, 2011). In comparison, Chinese firms represented approximately 9% of all cross listings and 6% of all IPOs during the same period (Alpert, 2010).

****Insert Figure 2.1 about here****

Chinese RMs have recently attracted significant attention in the financial media. Barron's articles "Beware this Chinese Import" (Alpert, 2010) and "Mergers that Don't Enrich Shareholders" (Barron's, 2010) highlight the poor performance they observe in Chinese RMs over the past few years. These articles make the point that although American investors are lured to invest in the incredible growth of China's economy, these firms, on average, exhibit poor performance when compared to benchmarks that include the Russell 2000 and Halter USX CHINA Index.

This study focuses on the characteristics and performance of these Chinese firms that engage in U.S. RMs. This investigation is the first to study the following four aspects of foreign RMs into the U.S.. First, I analyze the characteristics and performance of the Chinese firms in their home country before and after conducting a RM into the U.S.. Second, I track their a) industries, b) exchange listing migrations and status over their first two years and c) stock performance for those that obtain private investment in public equity (PIPE) financing versus those that do not. Third, I study the Chinese RM firm characteristics that drive their performance and influence their survival. Fourth, I compare Chinese RMs performance to RMs that take place between two U.S. firms, cross-listed Chinese firms (a modified Halter USX CHINA index) and the Russell 2000 during the same period.

In addition, this essay investigates three motivations that may explain why the percentage of Chinese RMs relative to the total number of RMs is so significant. First, my interviews with RM industry experts reveal many Chinese firms seek to move assets out of the communist governmental control to the U.S. market. This study examines and

compares Chinese RM's asset growth over time to U.S. RMs, which theoretically should not exhibit this motivation, to evaluate, if accurate, how this movement of assets affects subsequent performance. Second, these RM professionals report the ability to offer equity-based compensation, which has been illegal in China, has influenced Chinese firms' motivations to expand to the U.S. market through an RM. This essay assesses the effects of equity based compensation on performance and shareholders' wealth of Chinese RM firms. Third, RM experts report the majority of these Chinese firms are not listed in China prior to coming to the U.S.. The Chinese stock markets are considered by many to be very inefficient in that the government must approve a company's listing on a domestic exchange. Small to mid-size Chinese companies find the acquisition of growth capital very difficult and expensive. Therefore, as the literature's study of IPOs and cross-listed firms suggests, I hypothesize getting a listing on a U.S. exchange through an RM is a relatively easy and inexpensive way to gain credibility and potentially quick infusions of capital.

This study finds Chinese firms that come to the U.S. in this 7 year study of 2004-2010 are, on average, 8.4 years old, primarily private (over 83%), mid-size (median value market cap of $384.34 million and assets of $367.38 million) and profitable with a net income of 4.43%, an ROA of 1.33% and an ROE of 1.46%.

Results reveal, when compared to U.S. RMs, Chinese RMs are significantly larger, grow assets faster, are less likely to use PIPES, hold more insider stock, have more institutional stock interest and enter the U.S. at higher level stock exchanges. This Chinese RM sample is also less profitable and exhibits higher failure rates over the first

two years. However, despite U.S. RMs having a superior accounting performance, Chinese RMs experience significantly higher returns in the short and long run (particularly those that use PIPES). In addition, when compared to this study's sample of Chinese cross-listed firms and the Russell 2000, Chinese RM's outperformed both benchmarks in 2008 and 2009 and Chinese cross-listed firms in 2010.

The remainder of the paper proceeds as follows. Section 2.2 reviews the reverse merger process and the relevant literature. Section 2.3 outlines the theoretical basis for hypotheses to be tested. Section 2.4 describes the data sample and provides a financial transaction and characteristics summary. Section 2.5 presents the results of the analysis and Section 2.6 concludes.

2.2 THE REVERSE MERGER PROCESS AND RELATED LITERATURE

A "reverse merger", often termed a "reverse takeover", allows a private firm to acquire a publicly traded firm to obtain their exchange listing. For all practical purposes, the RM process is an acquisition where the target firm's management seeks a public entity with which to merge and arranges for the public acquirer to make a bid in exchange of some combination of cash and/or stock. The new corporate entity files forms with the SEC disclosing the particulars of the transaction and in almost all cases the target firm replaces the management and the surviving entity changes its stock symbol to reflect the new name (Feldmen, 2010).

One primary goal of a traditional IPO is to extract cash from the global capital market (Pagano, 1998). A RM, in contrast, requires the Chinese company to expend capital to execute what is effectively a purchase of the publically listed company. The literature identifies many reasons for firms to go public using an RM. First, when compared to an IPO which can take years to complete, most RMs are complete within 6 months (Feldmen, 2010). Second, RMs allow the target company to go public at significantly less cost than alternatives, to include traditional and penny stock IPOs (Gleason, 2005; Floros, 2009). RMs avoid most investment bank and underwriter fees, which can be a substantial savings (Gleason, 2006; Feldmen, 2010). Sjostrom (2008) reports RMs typically cost between $100,000 and $400,000 as opposed to an average of $9 million for an IPO. Third, the RM process avoids much of the SEC scrutiny compared to alternatives (Floros, 2010). Through 2004 very little information about the target firm was disclosed at the time of the transaction (e.g. Sjostrom, 2008; Feldmen, 2010). The SEC enacted stricter rules on RMs in 2005 (Gleason, 2006; SEC, 2005). Within four days of the consummation of the transaction, an 8-K must be filed that include the new firms purpose, two years of financial statements, a list of officers, stockholders, and directors, as well as their compensation (SEC, 2005). Despite this additional scrutiny, Barron's, among others, imply the RM process allows less reputable firms to go public (Alpert, 2010). In contrast, Sjostrom (2008) and industry experts argue the new SEC regulations with related scrutiny have enhanced the credibility of RMs.

Despite the increased popularity of reverse mergers, there have been few studies in the literature. The following review represents all the RM research found to date.

Gleason, Rosenthal, and Wiggins (2005) examine 121 RMs of public companies listed on the NYSE and NASDAQ-AMEX between 1987 and 2001. Overall, the firms in their sample are large public firms with existing operations. They find that the RM participants are poor performers, and only 46% of the companies in their sample survive two years. They conclude RMs are a high risk choice for going public, although significantly positive announcement returns are often experienced by the acquiring firm.

Gleason, Jain, and Rosenthal (2006) compare RMs to traditional and self-underwritten IPOs. They study 119 RM transactions between companies listed on the major stock exchanges between 1986 and 2002. They find RMs and self-underwritten IPO companies overall are smaller with lower profitability and outperform traditional IPO's over the first few months. However, in their longer run analysis of three years, all the groups have similar performance track records.

Adjei, Cyree and Walker (2008) study 286 RMs and 2,860 IPOs from 1990 through 2002, and find 42% of RMs and 27% of IPOs are delisted within three years of going public. They show that 1.4% of RMs do not meet any initial listing requirements and exhibit lower profitability and survival rates compared to IPOs.

Sjostrom (2008) documents the RM process, legal structure and compliance requirements. He argues RMs are smaller on average and thus, generally cannot be compared to traditional IPOs.

Carpentier and Suret (2008) find Canadian companies that go public using RMs have generally poor performance after going public. Carpentier, Cumming, and Suret

(2009) compare going public with Canadian RMs and IPOs and find the choice of a reputable auditor adds value in issuing IPOs, which have a higher level of disclosure.

Floros and Shastri (2010) study the decision to go public comparing RMs between U.S. based private and public firms listed on U.S. stock exchanges versus penny stock IPOs. They argue firms involved with RMs are information asymmetric as very little stock is issued to the public.

Floros and Sapp (2010) study 585 trading shell companies from 2006 - 2008 that are trying to consummate a RM agreement with a private company based in the U.S.. They find a significant percentage of RMs are consummated with public shell companies organized specifically to transact RMs with promising private firms. Their results show average successful transactions experience returns of 48.1% over the first 3 months and are more profitable than that of Special Purpose Acquisition Companies (SPACs).

In summary, previous studies have focused on RMs between companies that are already operating and listed on a U.S. or the Canadian stock exchange. To my knowledge, no study has focused on foreign companies that conduct reverse mergers in the U.S..

2.3 HYPOTHESIS DEVELOPMENT

In addition to the previously listed reasons for private companies to use RMs as a mechanism for going public, my interviews with a principle partner in each of the top three law practices (as rated by numbers of RM transactions representing Chinese RMs

entering the U.S. (PrivateRaise, 2011)) that cater to Chinese RM participants lead me to test the following hypotheses.

First, these RM attorneys concur with my data findings that the vast majority (over 83%) of these Chinese RM firms are mid-size private sector companies not listed in China prior to coming to the U.S.. They report many principle stock holders of Chinese RM companies clearly state they seek to move assets out of the communist governmental control to the U.S. market. If this is accurate, the expectation would be Chinese RMs would grow assets in the U.S. at a faster pace than other RM firms that do not have this motivation. I test this hypothesis by measuring the rate of Chinese RM asset growth compared to U.S. RMs, which theoretically should not exhibit this behavior. I also test this rate of asset growth's influence, if any, on performance.

Second, these RM industry experts report the ability to offer equity-based compensation, which has been illegal in China for listed firms, influences Chinese firms' motivations to expand to the U.S. market through an RM. Magnan and Li (2008) find equity based compensation to be a significant predictor of Chinese firms decisions to cross-list into the U.S.. I investigate the effects of equity-based compensation on the decision to pursue an RM, subsequent performance and shareholders' wealth of Chinese RM firms.

Third, the Chinese stock markets are considered by many to be inefficient in that several layers of government must approve a company's listing on a domestic exchange. In addition, Chinese entrepreneurs face significant hurdles securing capital. Industry experts report bank lending is out of reach for smaller Chinese firms since loan officers

favor larger, state-owned enterprises. The Chinese black market can deliver capital to the smallest businesses, however often at cost prohibitive annual interest rates of as much as 200%. Coming to the U.S. with IPOs can involve a three-year application process with an uncertain outcome (Ritter, 1987; Adjei et al., 2008). In this environment of few outlets to finance expansion, it's not necessarily a surprise that some Chinese entrepreneurs view the RM as a viable shortcut to gain credibility and potentially quick capital infusions. Therefore, I hypothesize Chinese RM firms will access capital at a faster pace than U.S. RMs participants, which may find accessing capital quickly is not as important or difficult to do at reasonable interest rates.

2.4 SAMPLE AND METHODOLOGY

2.4.1 Data sources

One significant reason RMs have not been analyzed in detail is because the data has not been readily available. Most of these small cap companies trade on pink sheets or the Over the Counter Bulletin Board (OTCBB) and are not identified or tracked by popular data sites (e.g. CRSP and COMPUSTAT). I obtain detailed RM data from DealFlow Media and their subsidiary PrivateRaise's (DFPR) subscription database. This firm has tracked RM participant's characteristics, PIPE related data (if applicable) and basic transaction information since January 2004. The total Chinese RM sample represents 442 transactions that took place from January 1, 2004 through December 31, 2010. DFPR has tracked RMs in significantly more detail since 2008, resulting in a 208 Chinese RM subsample and a 440 U.S. RM sample that is used throughout much of this analysis. These samples represent all the Chinese and U.S. RM transactions in the three

year period January 1, 2008 through December 31, 2010. DFPR variables include state of incorporation, merger and incorporation dates, numbers of authorized and outstanding shares, initial and surviving corporate names and stock symbols, industry and sector, equity based compensation, shell and PIPE details (if applicable) and closing prices for day one and four weeks after the completed transaction date (PrivateRaise, 2011).

DFPR does not track daily stock transactions or ongoing financial statement data. I obtain daily stock transaction data from Bloomberg and Yahoo Finance. Financial statement information is hand collected from SEC filed 8-K/As, 8-Ks, 10Ks, SC-14F1s, Bloomberg and Yahoo Finance. From these filings I collect key accounting variables for these Chinese RM firms for two years before they consummate their RM, and for every year thereafter through 2010 or their delisting, whichever occurs first. The accounting variables include total assets, revenue, net income, cash and equivalents, debt, operating cash flow, beta, numbers of outstanding shares, shareholder stock options and percentage of stock held by insiders and institutions.

Sjostrom (2008), Floros and Shastri (2010) and Floros and Sapp (2010) note that RMs should not be compared to traditional IPOs for reasons that include their smaller size and information asymmetry. I compare these Chinese RM companies' characteristics and performances from January 1, 2008 through December 31, 2010 to three benchmarks. First, at the time of this study, the Halter USX CHINA Index is comprised of 198 Chinese firms that include 75 Chinese RMs. I use the financial data for the remaining 123 cross-listed Chinese firms to create one benchmark for financial characteristics and performance comparisons. Second, to analyze any unique Chinese

motivations for RMs, I also compare their characteristics and performance to the 440 RMs consummated between two U.S. firms that took place in the same time period, January 1, 2008 through December 31, 2010. Third, I compare Chinese RM performance to the Russell 2000.

2.4.2 Sample summary and financial characteristics

Table 1 breaks down all RMs into the U. S. markets by target country from January 1, 2008 through December 31, 2010. Approximately 68% (208 of 304) of the foreign RMs (28% of all RMs that take place on U.S. exchanges) involved Chinese companies. Table 2.1 also reveals the recent growth of Chinese RMs, which have increased by 66% (53 to 88) from 2009 to 2010, whereas the numbers of U.S. RMs has decreased by over 4% (157 to 150) during the same period. Figure 2.2 gives a graphical depiction of the relative number of RMs consummated by U.S., Chinese, and foreign (non-China) firms by quarter from January 1, 2008 through December 31, 2010, and reflects the increase in Chinese RMs versus the decline in the number of U.S. RMs since 2009.

****Insert Table 2.1 about here****

****Insert Figure 2.2 about here****

Tables 2.2, 2.3, 2.4, 2.5 and 2.6 report summary statistics for Chinese and U.S. RMs for the sample period of January 1, 2008 through December 31, 2010. The results reveal the following observations.

Sjostrom (2008) argues access to PIPE financing (typically supplied by hedge funds) is the primary reason firms choose RMs as the vehicle by which to go public, as they have no other alternatives for funding. Table 2.2 reports 36.06% (75 of 208) of Chinese RMs use PIPEs to fund their RMs compared to 41.82% (184 of 440) of U.S. RMs. These percentages of RMs using PIPES are significantly lower than the average of 67.23% reported by Floros and Shastri (2010) in their earlier U.S. based RM sample. In contrast, this current study's results are much higher than the 20% reported in Gleason's 2005 sample of U.S. RM's that used PIPES between 1987 and 2001. Table 2.2 also reveals Chinese RMs raise over 400% more capital (to include PIPEs), on average, at the time of the transaction than U.S. RMs ($7.3 million versus $1.8 million). This result appears to support the hypothesis that Chinese RM participants appear to seek quick infusions of capital.

****Insert Table 2.2 about here****

As reflected in Panel A of Table 2.3, the average market capitalization of Chinese RMs ($77.8 million) at closing is over 48% higher than U.S. RMs ($52.3 million). In comparison, Gleason, Rosenthal and Wiggins (2005) find the values of their 1986-2002 U.S. RM sample to have a mean of $8.4 million (median of $1.76 million). After four weeks, on average, the Chinese RMs market capitalization grows by over 25% ($77.6 M to $97.2M) versus U.S. RMs growth of 11% ($52.3 M to $58.1 M). Overall, these results appear to support the hypothesis that Chinese RMs seek more capital and grow assets at a faster pace than U.S. RMs.

****Insert Table 2.3 about here****

Short run stock prices gathered from the DFPR data base, as shown in Panel B of Table 2.3, indicate Chinese RMs stocks experience higher returns than U.S. RMs in this sample period. During the first four weeks of operation, the Chinese RMs average stock price increases 12.25% ($2.53 to $2.84) as compared to the U.S. RM price decrease of approximately 4% ($2.33 to $2.23).

Table 2.4's percentage ownership metrics reveal Chinese RMs have higher averages than U.S. RMs for both ownership percentages issued in the share exchange without PIPES (85.2 % versus 72.3%) and with PIPEs (87% versus 75.7%). Although not reported in this table, 18% of Chinese RMs during this period involved shell companies as compared to 63% of U.S. RMs. These results indicate Chinese and U.S. RMs release significantly more stock to the public as compared to the 3% reported by the Floros and Sapp (2010) RM shell company sample. In addition, the data shows 88% of Chinese RMs have a form of equity based compensation versus 67% of U.S. RMs. These results appear to support the hypothesis that the principles in Chinese RMs are motivated by the use of equity based compensation.

****Insert Table 2.4 about here****

Table 2.5 reports Chinese RMs are far more likely to initially take place on the higher level stock exchanges than U.S. RMs, as 6.6% (14 of 208) of Chinese firms take place on the NYSE or NASDAQ versus only .06% (3 of 440) of the U.S. RMs. As found in previous studies (e.g. Gleason et al., 2005) that study RMs, this table reports most

Chinese (76.44%) and U.S. RMs (85.23%) take place on the OTTBB exchange. In addition, PIPE financing appears to be a key source of funding for the Chinese RMs that take place on higher exchanges as opposed to U.S. RMs, that show no use of PIPEs.

****Insert Table 2.5 about here****

Table 2.6 breaks down the samples by initial industry for the period. When compared to U.S. RMs, Chinese RMs are more heavily weighted in basic materials (9% to 5.4%) and consumer/retail (29% to 10.9%). U.S. RMs are more concentrated in energy (15.7% to 5.8%), financial institutions (3.4% to 1.4%), industrial (21.8% to 15%) and media (8.8% to 3.4%).

****Insert Table 2.6 about here****

2.5 EMPIRICAL RESULTS

Next I study how the sample of Chinese RM firms compare to the 123 cross-listed firms that comprise the Halter USX CHINA Index with regard to their operating and financial characteristics. Table 2.7 reports the summary statistics for the key comparisons for those that existed and had data available on December 31, 2009. Like Sjostrom (2008), who reports RMs can not be fairly compared to IPOs, results show Chinese RMs are significantly different than Chinese cross-listed companies with respect to almost every measured metric. Comparing median values, Chinese cross-listed firms have almost 8.5 times the market capitalization ($394 million to $46.7 million), 14 times more

total assets than Chinese RMs ($365 million to $51.7 million), almost 500% more revenue ($284 million to $58 million), over 1100% the operating cash flow and 6.6 times the number of employees. Because of these dissimilarities, I support Sjostrom's (2008) arguement and concentrate the balance of financial analysis comparing Chinese RMs to those RMs that take place between two U.S. firms.

****Insert Table 2.7 about here****

Following Gleason, Jain, and Rosenthal (2006), I calculate buy and hold returns for N firms as: $Buy\ and\ Hold\ Return = \sum_{i=1}^{N} w_i [\prod_{t=2}^{T_i}(1 + R_{it}) - 1]\ X\ 100$

where: w_i = average holding period weight for stock i
R_{it}= stock i's return on day t
T_i = delisted date or the end of the holding period, whichever comes first

Following Floros and Sapp (2010), I use the Fama-French three-factor regression model as a benchmark, where the return of a portfolio of reverse mergers is that in excess of the one month T-bill return. The BHR abnormal returns are based on an equally weighted portfolio. Similar results were obtained with the value weighted portfolio.

Many of these Chinese RM stocks are initially thinly traded and therefore have significant spreads between the bid and ask pricing. Floros and Sapp (2010) find their median RM shell companies' spread is close to 45%. I follow the recommendations made by Fisher, Weaver and Webb (2009) and Floros and Sapp (2010), and use the midpoint of the spread to mitigate the bid ask bounce.

Using daily returns beginning 30 days prior to the RM, I study the performance of the 183 Chinese and 415 U.S. RM participants that actually traded stock before and after

they consummate the transaction. I begin by examining the returns beginning 30 days prior through 30 days after the RMs consummation. Figure 2.3 reveals more significant results than stated earlier with the four week DFPR reported price changes shown in Panel A of Table 2.3. The total sample of Chinese RMs (with and without the use of PIPES) has an average return of approximately 35%, which is significantly more than the 12.25% first four week metric DFPR captures after the transaction closes. Although the Chinese RM result appears significant, Floros and Sapp (2010) report their RM shell sample firms experience a 54% increase in this 60 day window. In addition, as other studies have shown (e.g. Gleason et al., 2005; Floros and Sapp, 2010) and the graph depicts, the results show evidence of an increase in wealth to the public firm's stockholders after the announcement dates, which in this sample are all within five weeks before the RM consummation date. Gleason, Rosenthal and Wiggins (2005) and Floros and Sapp (2010) find similar results and suggest insiders are investing more capital and running up the price as a successful transaction becomes more evident. The same is true of the U.S. RMs, on average, as they experience an overall return of approximately 15% during the 60 day period as opposed to the reported DFPR 4% decrease over the first four weeks after the transaction takes place. There is also a price correction that appears for both U.S. and Chinese RMs within a few day window following the consummation date that appears to reflect the market's reaction to the SEC documents required to be filed within four days following the transaction. Overall, however, Chinese RMs significantly outperform U.S. RMs over the sixty day period.

****Insert Figure 2.3 about here****

Prior research (e.g. Gleason et al., 2005; Floros and Shastrie, 2009) reports RMs' BHRs are different when comparisons are made with those that use PIPES and those firms that do not. Table 2.8 separates the Chinese and U.S. RM sample into PIPE/non-PIPE transactions and presents the short and long run BHRs for various event windows. The total sample varies by year for each set as noted in column N in each panel, revealing that the majority of transactions do not use PIPES and fewer firms exist over time. The Chinese RM's results report performance for the period January 1, 2004 through December 31, 2010. The U.S. RM's results reflect performance for the period January 1, 2008 through December 31, 2010. The longer Chinese RM sample period allows a study of some firms over a period of up to four years, whereas data availability limits the study of the U.S. RMs to a maximum of 2 years. The stocks are equally valued and the BHRs represent the cumulative market change over the relevant event window. Panel A reflects results for those firms that do not use PIPES and Panel B reports results for those firms that use PIPE financing at the time of the initial transaction. The results are significantly different when comparing Chinese RM to U.S. RM returns, with and without the use of PIPES.

Table 2.8, Panel A's first event window (-30, -1) reports the change in price in the 30 days before the RM transaction. Chinese RM firms, on average, that do not use PIPES realize a 9.61% return as opposed to the U.S. RM non-PIPE return of 4.77%. Over time, the Chinese non-PIPE RMs never yield a negative return and those that survive yield a 33.24% average return over their first four years. The U.S. non-PIPE sample, however, although positive over time, yields negative returns over the first ninety days and 4.56% over the first two years as opposed to the Chinese RM two year return of 22.45%.

Table 2.8, Panel B shows all the Chinese PIPE RM event windows to yield higher returns than the U.S. PIPE RMs as well as Panel A Chinese non-PIPE RMs. As compared to Panel A, Panel B reports the average return for Chinese PIPE RMs is 16.44% as compared to 12.68% for U.S. PIPE RMs for the same 30 days prior to the RM consummation. The first 90 day window after the RM transaction yields 31.53% for Chinese PIPE RMs as compared to the U.S. PIPE RM's 12.41%. Floros and Sapp (2010) report RMs that are formed with shell companies using PIPES experience a significantly higher yield of 48% in the first 90 days. To make a direct comparison, two year returns are, on average, 34.77% for the Chinese PIPE RMs compared to a 9.11% U.S. PIPE RM return. These results are significantly higher than the negative 2.1% first two year shell RM results reported by Floros and Sapp (2010), but overall, consistent with previous studies (e.g. Gleason et al., 2005; Floros and Shastri, 2010) that show RMs using PIPEs experience higher returns. Chinese PIPE RMs that survive four years yield a 44.32% return as opposed to the 33.24% return for non-PIPE Chinese RMs.. In summary, comparing results in Panel A to Panel B with respect to short and long run returns, there is a significant improvement for RMs that use PIPES over those that do not.

In addition, PIPE use appears to influence the number of firms that survive. As reported in Table 2.8, Panel A, approximately 49% (104 of 212) of the Chinese RMs that do not use PIPES survive 2 years and 17% (36 of 212) four years. Approximately 24% (59 of 244) of U.S. non-PIPE RMs survive two years. Over 63% (77 of 122) of Chinese PIPE RMs survive two years as compared to 49% non-PIPE Chinese RMs. Over 33% (41 of 122) of Chinese PIPE RMs survive four years as compared to the 17% that do not use PIPES. U.S. PIPE RMs realize a similar difference with over 36% (65 of 177) PIPE

firms surviving two years as opposed to 24% of non-PIPE U.S. RMs. Floros and Shastri (2010) find simliar PIPE influence on shell RM survival rates. They report 90.20% of shell PIPE RMs survive three years as opposed to 27.5% of firms unable or unwilling to receive PIPE financing.

****Insert Table 2.8 about here****

Next, I examine survival numbers by year, the different reasons these firms did not survive, as well as their exchange migrations over time. Table 2.9 reports the results for the full sample of Chinese and U.S. RM's which varies by year for each set, reflecting the fewer firms that exist over time and data availability.

Table 2.9, Panel A reflects the survival rates for all Chinese RM's that took place between January 1, 2004 through December 31, 2010 and the U.S. RM's that took place between January 1, 2008 through December 31, 2010. Because of data limitations for U.S. RMs, the only direct comparison to Chinese RMs is for the two year period, which shows 93.23% of U.S. RMs survive two years as opposed to 66.54% of Chinese RMs. Both rates are significantly higher than the Gleason, Rosenthal and Wiggins (2005) study of 1981-2001 major stock exchange RMs, which reports 46% of their sample survived two years. Since they were exclusively studying U.S. RMs participants, it would suggest RM participants are getting stronger financially. Panel A further reports 72.22% of the remaining Chinese RM firms survive the third year, 68.75% the fourth year and 64.47% of Chinese RMs survive the fifth year. Overall, 52.6% of the Chinese RMs survive three years (143 of 272), as compared to the 42% three year survival rate reported by Adjie, Cyree and Walker (2007). This study's higher survival statistics are argued by RM

experts to be a result of the additional SEC scrutiny RMs have received since 2005, however the results show approximately 30 to 35% of the Chinese RMs are going out of business per year.

Table 2.9, Panel B reflects any changes in listing status for both groups during their first two years, tracking their exchange migrations back and forth from pink sheets and OTC Bulletin Board listings to NASDAQ and/or the NYSE. Floros and Shastri (2009) argue the primary goal for an RM is to move to higher level stock exchanges. Results show almost 94% of U.S. RMs do not change their listing status over this sample period as compared to approximately 61% of Chinese RMs. These results for U.S. RMs are significantly different than those found by Gleason, Rosenthal and Wiggins (2005), which report only 66% of their U.S. RM sample had no change in listing exchange over the first two years for their study period of 1991 through 2002. Although Chinese RMs are more successful moving up in exchanges (11% to U.S. RMs 1%), they are more likely to fall back into lower exchanges (over 28% to U.S. RMs 5.23%). Although not reported in this table, over a window of five years, 14.27% of Chinese RMs move up in exchanges and 33.66% move down.

With data collected from SEC filings, Table 2.9, Panel C reports the different reasons that the RM's in both groups did not survive. Although the Chinese RM results reflect data collected for seven years as opposed to the three years for U.S. RMs, the percentages are similar, with bankruptcy being the largest explanation (63.1% for Chinese RMs and 64.0% for U.S. RMs), followed by acquisition, going private and transacting another RM.

Insert Table 2.9 about here

Next, examining the financial characteristic differences for these Chinese and U.S. RM firms, Table 2.10 compares the median values for the 208 Chinese and 440 U.S. RM's that took place between January 1, 2008 through December 31, 2010. Net profit margin is net income divided by sales, % Institute is the total percentage of institutional ownership and % Insiders is the total percentage of insider ownership. Overall, results show significant differences in these RMs, with Wilcoxon two sample median comparison z test statistics all significant at the 1% level, with the exceptions of operating cash flow and number of outstanding shares. On average, Chinese RMs are 68% larger with a market cap of $96.8 million compared to the U.S. median value of $57.6 million and have 85% more assets ($88.33 million to $47.99). Chinese RMs are more profitable (1.24% to 1.03%), have a higher percentage of institutional ownership (7.11% to 4.22%), and higher percentages of stock owned by insiders (85.82% to 76.48). This result appears to support the hypothesis that equity compensation is a motivation for Chinese RMs, as owners maintain significantly more stock.

Insert Table 2.10 about here

No study to date has examined foreign firm characteristics before they came to the U.S. using an RM. Reporting median values, Column 1 of Table 2.11 reflects an summary of the SEC filing's Chinese firm financial characteristics data for the two year period prior to consummating a U.S. RM. Although not reported on the table, the data shows 83.4% of these firms are private firms in China before coming to the U.S., with an average age of 8.4 years. As Table 2.11 reports, these are midsize firms with a market cap

of $384.34 million, total assets of $367.38 million, have a net income of 4.43%, an ROA of 1.33% and an ROE of 1.46%.

****Insert Table 2.11 about here****

Table 2.11 also shows results of a study as to how these Chinese and U.S. RM's financial characteristics change during their first two years of operation. Using median values, columns 2 and 3 compare Chinese and U.S. RMs for the end of year one and columns 5 and 6 compare their characteristics at the end of year two. Again, overall results show statistically significant differences in these RMs using Wilcoxon median comparison z test statistics for most characteristics. Chinese RM's market cap grows over 52% from the end of year one to the end of year two ($77.63 million to $118.31million) compared to a U.S. RM growth rate of 19.44% ($52.3 million to $62.47 million). In the second year, Chinese RM assets grow 36.75% as opposed to U.S. RM's 7.98%, a 460% increase. Although net income percentages are positive and increase for both Chinese and U.S. RMs over the first two years, U.S. RMs are more profitable year one (1.44% to Chinese 0.65%) and year two (1.61% to Chinese 1.16%). U.S. RMs also have a significantly higher ROA for year one (3.75% to Chinese 0.75%) and year two (4.08% to Chinese 3.75%). These results would appear to support the hypothesis that Chinese RM firms may be more motivated to move and grow assets at a faster pace than other RMs and perhaps less likely to be concerned about the returns for their stockholders. These results are significantly different than those reported by other studies. Floros and Sapp (2010), argue RMs are, on average, illiquid, unprofitable and have few assets. Carpentier

and Suret (2008) report Canadian RMs have very low profitability with little to no ongoing improvement and subsequently, a low survival rate.

Table 2.11 also shows Chinese RMs continue to hold more insider stock than U.S. RMs at the end of year one (87.3% to U.S. 78.68%) through year two (83.64% to U.S. 74.32%), which also appears to support the hypothesis that equity based compensation through insider stock ownership is more prevalent in Chinese RMs. In summary, over their first two years, both Chinese and U.S. RMs firms are increasing revenue and debt, improving margins, see an increase in institutional stock ownership, release more shares to the public and improve profitability as measured by ROA and ROE. Interestingly, despite the relative poorer financial performance shown in Table 2.11, Chinese RMs realize higher returns than the U.S. RMs.

To determine the Chinese RM firm characteristics that drive performance, Table 2.12 reports regression results for the impact of firm specific variables on the returns (R_{it}) of Chinese RMs that survive one year. Specifically, the following model is estimated:

$$R_{it} = a + \beta_1 SIZE_{it} + \beta_2 CASH_{it} + \beta_3 ROA_{it} + \beta_4 ROE_{it} + \beta_5 IND_{it} + \beta_6 EQUITY_{it} + \beta_6 PIPE_{it} + \varepsilon_{it}$$

I use the log of total assets (*SIZE*) as a proxy for firm size, cash and equivalents (*CASH*) to total assets to control for liquidity constraints and both return on assets (*ROA*) and return on equity (*ROE*) for profitability. Previous studies have found conflicting results with regard to whether returns are influenced by the RM participants being from different industries (*IND*) and the use of PIPE (*PIPE*) financing. Therefore, I use dummy variables for these as well as for equity based compensation (*EQUITY*) to investigate whether these variables influence Chinese RM firms' performance over time. Table 2.12 presents three

models, one for each dummy interaction variable. Overall, results indicate larger, more liquid firms experience higher returns, as the coefficients for log of total assets (*SIZE*) and CASH are positive and significant at the 1% level. Like Gleason, Rosenthal and Wiggins (2005), this study finds participants being from the same industry are not statistically significant with respect to long run returns (the results reported are for the basic materials industry, which had the highest coefficient (.0001) and statistical significance (0.07)).

****Insert Table 2.12 about here****

Table 2.12 results also reveal firms that offer equity based compensation experience statistically significant higher first year returns at the 1% level. This result appears to support the hypothesis that equity based compensation plays a role in Chinese RMs. In addition, as previous evidence has shown, those firms using PIPES realize a positive and significant increase in returns. Overall, the three models have adjusted R-squares that range from 14.36% to 22.67% and F statistics show all the models are significant at the 1% level.

****Insert Table 2.13 about here****

Finally, I compare this study's results to the two highlighted Barron's articles that report Chinese RMs, on average, exhibit poor performance as compared to the Russell 2000 and the Halter USX CHINA Index. Having met with an author of the Barron's articles and receiving their sample and a copy of their program that searched for their Chinese RM transactions, I question the accuracy of their benchmark and sample.

Barron's failed to recognize that 75 of the 198 Chinese firms that comprise the Halter USX CHINA index are RMs. In addition, their program that searched for Chinese RMs was flawed, as 36% of their sample are not RMs but regular takeovers taking place in the U.S.. Table 2.13 reports an accurate comparison of Chinese RM performance to that of U.S. RMs, Chinese cross-listed firms (a modified Halter USX CHINA INDEX) and the Russell 2000 for the three year period of 2008-2010 (Russell, 2011). Chinese RMs, on average, outperform all these benchmarks in every year of this period with the exception of the Russell 2000 in 2010 (25.3% to the Chinese RM return of 21.54%).

2.6 CONCLUDING REMARKS

Although there has been some research of U.S. participants in RMs, this is the first study focused on the foreign companies that come to the U.S. through a RM. These transactions are important as foreign firms entering the U.S. have accounted for over 40% of RMs taking place on U.S. exchanges from 2004 - 2010, as compared to approximately 9% of all cross listings and 6% of all IPOs during the same period. This study fills this research gap as it examines the motivations, financial characteristics, and performance of foreign RMs. Focusing on Chinese RMs, which have accounted for over 63% of RMs into the U.S. since 2008, this is the first study to analyze foreign RMs firms' characteristics prior to coming to the U.S. and up to five years after being listed on a U.S. stock exchange.

Results show, on average, that Chinese firms that engage in RMs are private firms not listed in China, are motivated by the ability to offer equity based compensation

(which has been illegal in China), seek quick infusions of capital and grow assets in the U.S. very quickly relative to U.S. RMs (which may indicate a movement of assets out of China). In addition, Chinese RMs experience significantly higher short and long term performance when compared to benchmarks that include cross-listed Chinese firms that comprise the Halter USX CHINA Index, the Russell 2000 and U.S. RMs.

The evidence also shows Chinese and U.S. RMs that use PIPES experience higher returns and survival rates, however U.S. RM's, overall, have a higher rate of survival in the first two year period. In summary, although RMs do seem to involve considerable risk, both Chinese and U.S. RM's generate positive long-term performance for shareholders of the new entity.

CHAPTER 3

BONDING WITH ETFS: A STUDY OF BOND ETF MISPRICING

3.1 INTRODUCTION

Since being introduced in 2002, fixed income (Bond) exchange traded funds (ETFs) have become an important asset class, yet they have garnered little academic study. This paper investigates the pricing deviations of Bond ETFs from the underlying securities' net asset values (NAV). For the ETF model to work, the funds methodologies depend on NAVs of individual units correlating closely with the price of the ETF units themselves. Since 2008's financial breakdown, Bond ETF mechanisms seem to have been failing with many Bond ETFs experiencing significant premiums and discounts. The financial media has highlighted the fact that Bond ETFs are not the safe havens investors may think (e.g. Salisbury 2010). Some additional evidence published to date includes:

1) From its launch in April 2007 through October 6, 2009, the Vanguard Total Bond Market ETF closing daily price was equal to or above the net asset value 98% of the time, and 36% of the time by a significant .5% or more (Laise, 2009).
2) iShares High Yield Corporate Bond ETF traded at a 12.49% premium at one point in April 2009, and traded within .5% of its NAV only five days in the 3rd quarter of 2009 (Laise, 2009).
3) Barclays Capital High Yield Bond Fund market price gained 6% in the 12 months ending August 31, 2009 although it's NAV lost 1% (Lauricella, 2009).

4) In 2009, the Bond ETF shares of Barclays 1-3 year Credit Bond Fund regularly traded at premiums of 2% or more, and did not trade within .5% of its NAV on any day in the third quarter (Lauricella, 2009).

"In stock ETFs, if there was a premium at all above .5%, you wouldn't touch it with a 10 foot pole", reports Matt Hougam, director of the ETF analysis for Indexuniverse.com (Laise, 2010). "While investors can allow Bond ETF's more leeway, a premium over 1% should definitely set off warning signs" argues Rick Ferri, a financial advisor and author of "The ETF Book". Ferri reports he stopped using Bond ETF's in 2008 when he noticed their market prices moving away from the NAV. "But in the more volatile markets ... it got a lot worse than I ever would've expected" he says. "I don't see the benefit for any investor" (Ferri, 2009).

However, these premiums have not stopped investors from investing in Bond ETF's and the market has catered to the increased demand. As Figure 3.1 reports, the number of Bond ETFs has dramatically increased, expanding from only 6 at the end of 2006 to 118 at the end of 2010. Figure 3.2 plots the dramatic increase in Bond ETF capital investment by year from 2002 - 2010. Bond ETF's held $119.6 billion at the end of 2010, up 234% from the end of 2008 (Lim, 2011). Over half of the new ETF cash flow from early 2009 through 2010 has been in Bond ETFs (Lauricella, 2011). As Figure 3.3 reflects, all the major sectors (government, investment corporate and junk bonds) have experienced more capital investment during 2008-2010 as they did in the previous nine years combined.

****Insert Figure 3.1 about here****

****Insert Figure 3.2 about here****

****Insert Figure 3.3 about here****

This significant infusion of capital investment in Bond ETFs since 2008 is primarily due to two reported reasons: 1) fear - as investors pull their money out of the stock market and into what they perceive as safer and more reliable income investments and 2) greed - a significant portion of new investment is chasing large returns in high yield bonds to make up for huge losses in stock since 2008.

The Law of One Price would suggest that the price of a basket of securities should equal the component parts prices. Deviations in ETF fund prices from their fundamental NAV's should not be observed in an efficient liquid market with no arbitrage limits. In theory, arbitrage is a key principle in financial markets as it is a key mechanism to allow efficiency. However, in reality, arbitrage is limited to the extent that there are frictions and limitations in the market. These limitations and frictions should be reflected in ETF pricing deviations from NAV.

In addition to the value of the underlying securities, recent studies argue equity mutual fund and ETF pricing are affected by a combination of factors that include liquidity (e.g. Amihud 1986, 2002; Ackert and Tian 2008), fund flows (e.g. Edelen, 2001; Kalaycioglu, 2004), momentum (e.g. Ackert and Tian, 2008), market volatility (e.g. Ackert and Tian, 2008), market sentiment (e.g. Lee et al., 1991) and errors in reported prices (e.g. Ferri, 2009).

This study investigates how these and other factors that are unique to fixed income markets drive market premiums and discounts and their influences on Bond ETF price levels. I analyze these effects from the inception of Bond ETFs in 2002 through 2010, which includes extremely volatile periods of time during which many individual fixed income securities did not trade. As the Bond ETF market continues to expand, it is important for investors to understand pricing and trading behavior to help achieve more efficient execution. To my knowledge, there has not been a complete study of the factors that influence Bond ETF premiums/discounts or the ETF Authorized Participants (APs) ability and/or inclination to arbitrage Bond ETF mispricing.

Results reveal significant (far exceeding the average 5 to 25 basis point premium found in equity ETFs) premiums for all Bond ETF sectors other than U.S. Treasuries, with aggregate ETF bond funds averaging a 63 basis point premium, a 151 basis point average premium in investment grade corporate Bond ETFs and an almost 2 full percentage point (199 basis points) average in high yield bond funds.

This study finds transaction costs, illiquidity, fund flow, momentum, volatility and market sentiment all have a statistically significant impact on premium. However, significant unexplained average premiums remain. These large and varied premiums may create significant trading costs for investors. Secondary market investors should be aware of these premiums and when the premiums are large, they should consider not transacting business.

The balance of the paper is organized as follows. In section 3.2, I review the literature identifying factors that have been shown to affect mispricing. Section 3.3

describes the data and reports summary information. Section 3.4 outlines the research method, section 3.5 presents empirical results and section 3.6 provides concluding remarks.

3.2 LITERATURE REVIEW

Exchange traded funds have garnered significant academic attention in recent years (for a better understanding of ETFs see Gastineau (2001) and "The ETF Book" by Ferri (2009)). An emphasis in recent study is whether U.S. ETF equity market prices deviate from net asset values. Elton, Gruber and Corner (2002) and Ackert and Tian (2000; 2008) analyze mispricing in equity ETF's based on U.S. indices and find discrepancies to be minimal, whereas Engle and Sarkar (2002; 2006) and Jares and Lavin (2004) find mispricing is prevalent in international equity ETF's. These studies find a significant portion of the international stock ETF's deviations are attributed to the minimal overlap of trading hours with their underlying markets and using stale underlying index values. Engle and Sarkar (2002) find mispricing for domestic stock ETF's average a premium of 5 basis points.

Other academic studies have shown ETF pricing is affected by a combination of factors that drive equities as well as factors that are unique to fixed income markets. These influences include transaction costs, liquidity, fund flows, momentum, market volatility, market sentiment and errors in reported prices.

Research has shown that liquidity affects pricing. For example, Amihud and Mendelson (1986) and Amihud (2002) provide evidence that security illiquidity drives lower asset prices and higher returns. Allen and Gale (1994) find illiquidity has a smaller

effect in open economies when compared to emerging markets. Ackert and Tian (2008) study country ETF equity funds offered in the U.S. and find a U-shaped relationship between fund premium and market liquidity, suggesting lower mispricing with more active trading. They also show illiquidity results in larger bid/ask spreads.

Fund flows have been studied for various asset classes. Warther (1995) and Edelen and Warner (2001) find a significantly positive relationship between cash flows into mutual funds, security returns and pricing. Edelen and Warner (2001) also find significant relationships between flow and the previous day's return, implying flows follow returns. Kalaycioglu (2004) studies the flow of funds into five stock ETF's indexes and the rate of return of the underlying indexes. Using monthly data, he finds a significant negative relationship between equity ETF flows and market pricing.

Momentum has been proven to have effects on ETF pricing in the literature. For example, Ackert and Tian (2008) report momentum (price changes in the NAV over time) has a significant statistical, although not economically significant, effect on premiums in equity ETF's both domestically and internationally.

Execution risk levels also affect the possibility of an arbitrage opportunity. Ackert and Tian (2008) find periods of high volatility of individual assets affect the magnitude of the equity ETF premiums or discounts, resulting in what arbitrageurs may view as being too risky for a profitable arbitrage opportunity.

Given the financial turmoil and resulting uncertainty since 2008, trading premiums and discounts may have been influenced by market sentiment, similar to the

literature's findings with closed end mutual fund discounts (e.g. Lee, Shleifer and Thaler, 1991).

Tucker and Laipply (2010) offer a theoretical framework for analyzing fixed income ETFs, and suggest prices are driven by four factors: the value of the underlying securities, the level of ETF supply and demand in the secondary market, the cost of share creation through the underlying fixed income markets and the level of the fixed income market volatility and liquidity.

The literature also highlights factors that are magnified and unique to fixed income markets which need to be considered. For example, the fund NAV is determined using the bid side of the market, whereas the creation of new ETF shares is done on the market's offer side for individual securities. In addition, a fund's NAV may be calculated using mid or offered prices and the creation costs must be calculated accordingly (Ferri, 2009). Another factor that influences the difference between reported NAV's and the value of fixed income securities is the market's practice in reporting. The market prices the ETF at 3:00 PM Eastern Standard Time, the close of the U.S. bond market, however, the fixed income ETF itself continues to trade until 4:00 PM Eastern Standard Time. Although Bond ETF fund data for this period of time is not yet available, any changes in pricing in this one-hour period will affect the apparent premium or discount. Volatile periods may have a significant effect during this one hour period.

No prior study has examined these combined influences on fixed income ETF's. The goal of this paper is to attempt to determine the factors that drive the

premium/discount and evaluate the arbitrage system in place to keep the market price of Bond ETF's close to their NAV.

3.3 SAMPLE AND SUMMARY STATISTICS

I obtained the Bond ETF data from Dr. Rabih Moussawi of the Wharton Research Data Services at The Wharton School, University of Pennsylvania. The data set includes daily fund returns over time for every fixed income ETF since their inception dates, with daily information that includes: CUSIP, return, closing price, closing bid and ask prices, mid-price (between bid and ask), spread, total volume, total shares outstanding (adjusted), changes in total shares outstanding, percent change in total shares outstanding, market, fund name, fund turnover ratio, NAV per share, the percentage difference between the last trade price and the NAV at the end of the day (premium or discount), and the absolute dollar difference between the last trade price and the closing NAV (premium or discount). The Wharton data also includes the monthly holdings for all ETF's since their inception, to include the CUSIP, fund name, portfolio identifier, inception date, the individual securities percentage of total net assets, number of securities shares, market value of the security on the report date, name of the security held, ticker symbol by the exchange, bond coupon rate and maturity date. I collect the daily VIX volatility index data for the period from the Chicago Board Options Exchange and the Baker and Wurgler (2006) monthly sentiment index from Wurgler's website.

The data set provides information for 118 fixed income ETFs, however as of December 31, 2010 only 95 ETFs existed for over one year (see Appendix 1 for the list of fixed income ETFs for the year ending December 31, 2010) with sufficient data for analysis. As this study focuses on U.S. Bond ETFs, I eliminate the 6 international funds

and the single convertible bond fund, resulting in 88 fixed income ETFs that existed for one year with complete data.

This essay studies Bond ETF's since their introduction in 2002 and depending on the analysis, is separated into various periods. The first period is 2002 through 2006, as there were only 6 Bond ETF funds in existence at the end of 2006. The second period used for the majority of the study is January 1, 2007 through December 31, 2010, which allows a study of a significantly larger number of Bond ETF funds. The second period (2007-2010) is further broken down into two timeframes of study to analyze any differences before and after the financial crisis of 2008. Specifically, the first timeframe January 1, 2007 through September 14, 2008 analyzes the period before the fall of Lehman Brothers, which is generally regarded as the trigger point of the financial crisis. The last timeframe of September 15, 2008 through December 31, 2010 allows a study of the premiums/discounts after the market's downturn in late 2008 and resurgence since March 2009.

I initially investigate the following four Bond ETFs that have been highlighted in the financial articles cited earlier for the entire year of 2009. I chose 2009 because U.S. Vanguard Total Bond Market ETF (symbol BND) and US SPDR Barclays Capital High Yield Bond ETF (symbol JNK) did not exist prior to 2009, but did exist for 247 and 248 days respectfully in 2009:

1. US iShares iBoxx High Yield Corporate Bond Fund (symbol HYG)
2. US Vanguard Total Bond Market ETF (symbol BND)
3. US SPDR Barclays Capital High Yield Bond ETF (symbol JNK)

4. US iShares Barclays 1-3 Year Credit Bond Fund (symbol CSJ)

As shown in Tables 3.1 and 3.2, several observations and conclusions can be made studying the descriptive and summary data for these four Bond ETF funds. Specifically:

1. These four funds reflect the enormous growth during 2009 in Bond ETF's with a low of 44% to a high of 416%.
2. The mean and median premium percentages, ranging from .6% to 2.2%, are much higher than that of equity ETF premiums. Ackert (2008) finds equity ETFs average 25 basis points and Engle and Sarkar (2002) find a 5 basis point premium, on average. In fact, these mean acquisition premiums are very expensive relative to almost any other investment (Bloomberg, 2010).
3. The premium lows, all but one being negative values, all occurred in the 2009 January through March's market lows. Not one was negative after April 1st, 2009. These negative values occurred when investors fled the market and Bond ETFs traded at meaningful discounts.
4. The maximum premiums, ranging from 2.8% to 12.8%, occurred after April 1st, 2009, after the market began rebounding.

****Insert Table 3.1 about here****

****Insert Table 3.2 about here****

For fixed income sector analysis, I separate the individual ETF Bond funds into groups that include 12 short term (1 to 3 year) Treasuries, 14 midterm Treasuries, 14 long-term (20 + years) Treasuries, 6 U.S. Treasury inflation protected security (TIPS)

funds, 9 aggregate bond funds, 28 investment-grade (to include municipals) and 4 high yield funds. Table 3.3 shows the results for an analysis of these Bond ETF fund sectors, reporting the average premium compared to the average range of bid/offer spreads experienced over the period 2007 through 2010. The results reveal significant (far exceeding the average 5 to 25 basis point premium found in equity ETFs) premiums for all sectors other than U.S. Treasuries, with aggregate ETF bond funds averaging a 63 basis point premium, a 151 basis point average premium in investment grade corporate Bond ETFs and an almost 2 full percentage point (199 basis points) average in high yield bond funds.

****Insert Table 3.3 about here****

3.4. METHODOLOGY

The objective of this paper is to gain insight in the relationship between premiums and discounts in Bond ETF prices and transaction costs, liquidity, fund flows, momentum, market volatility and market sentiment. Specifically, the following model is estimated:

$$P_{it} = a + \beta_1 COST_{it} + \beta_2 ILM_{it} + \beta_3 FLOW_{it} + \beta_4 MOM_{it} + \beta_5 VOL_{it} + \beta_6 SENT_{it} + \varepsilon_{it}$$

Following the literature (e.g. Ferri, 2009), the ETF market price discount/premium dependent variable is calculated using the following formula:

Market Price – End of Day NAV / End of Day NAV = Discount or Premium (P_{it})

The NAV is defined as follows:

NAV = Total underlying value of a fund's securities / Number of shares outstanding

In the fixed income markets, the fund NAV is determined using the bid side of the underlying market, while the individual bonds are acquired on the offer side. I control for this variation's effect on the reported premium/discount for each fund.

The independent variables are defined as follows:

1. Transaction (share creation) costs (*COST*) are considered in the literature to be the most significant component of fund premiums. Theoretically, a premium or discount could persist as long as it is not large enough for an arbitrage opportunity, meaning the transactions costs are larger than the premium or discount. The literature has shown transaction costs, due to acquiring all of the underlying securities, are the largest component of expense, as represented by their bid/ask spreads (e.g. Elton, 2002). In a perfectly balanced market, the underlying bid/offer spread would be minimal, however in an unbalanced market, the entire bid/offer spread may be priced into the transaction. Captured by the weighted average bid/offer spread observed in the underlying shares, the expectation would be that higher transaction costs would result in a higher premium. Cross sectional regression results that follow combine transaction costs individually and collectively (where degrees of freedom allow) with the following independent variables.
2. Liquidity (*ILM*) is a challenge faced by all bond investors and the literature shows less liquid underlying assets equate to larger premiums on average. Most bonds don't trade on exchanges, therefore the gap between the offer price and bid price is typically much wider than on stocks (Bonds, 2009). The recent significant capital infusion to most fixed income ETFs forces the Authorized Participants

(APs) to buy at the higher offer price. Kay (2009) reports APs may be pricing the ETF shares much higher than the NAV, resulting in a bias toward an even higher premium. Ackert and Tian's (2008) results indicate illiquidity is a significant driver of premiums in equity ETF's, both domestically and internationally. I follow their use of Amihud's (2002) illiquidity measure, defined as the square root of the daily return divided by daily dollar volume.

3. Following the theoretical framework of Tucker and Laipply (2010) and empirical work of Kalaycioughu (2004), the balance of trading activity in the ETF leads to the consideration of the level of supply and demand in the secondary market, termed the flow factor (*FLOW*). Like Kalaycioglu (2004), I calculate the flow factor incorporating the number of shares that are outstanding. Specifically, ETF flow at time *t* is determined in the following equation, with *sharesout* = number of shares outstanding:

$$flow_t = \frac{sharesout_t - sharesout_{t-1}}{sharesout_t}$$

A high flow factor would indicate a high level of net purchases, which would represent an environment for share creation. In contrast, a significant negative flow factor would indicate a high level of net sales, resulting in potential share redemptions. Therefore the nature of the coefficient of the flow factor would be expected to depend on the overall market's supply and demand as well as the ease in which the shares could be obtained for that fund at that time.

4. Ackert and Tian (2008) have shown momentum (*MOM*) to have statistically significant effects on equity ETF pricing. I follow their analysis for fixed income ETFs and measure momentum as the natural log of the ratio of the fixed income ETF funds closing NAV on day t divided by the closing NAV on day $t - 1$. As found in equity ETFs, the expectation would be for momentum to have a positive relationship to premiums.
5. Periods that exhibit high levels of market volatility (*VOL*) would make it difficult for authorized investors to execute an arbitrage opportunity. This execution risk adjustment magnitude would be driven by the overall level of volatility in the market and whether the AP is creating or redeeming ETF shares (generally negative for redemptions and positive for creations). Therefore I make adjustment for the risk associated with these volatile periods, with the expectation that more volatile markets would increase the premium as APs are more hesitant to create more shares. To be more specific, the NAV represents the weighted average of the underlying bond bid side prices but does not represent a simultaneous basket execution. In less liquid and transparent markets, the theoretical bid offer for a given bond can be highly volatile, and may only apply to a very narrow size of execution. Accordingly, broker dealers may encounter difficulties sourcing or selling bonds to satisfy creation or redemption for certain size of transactions. In highly stressed markets, the execution risk adjustment may be significant, allowing for larger than normal premiums or discounts. I use the CBOE volatility Index (VIX) as a key measure of market expectations of near term volatility.

Although it is conveyed for the S&P 500 stock index option prices, the literature has shown it to be a predictive barometer of market volatility.

6. The literature has shown that mutual fund flows can be argued to reflect investor sentiment (*SENT*) (e.g. Black, 1986; Lee, 1991; Warther, 1995). The evidence shows during periods of positive sentiment, more investments are made in a market with higher returns. Although Baker and Wurgler (2006) argue that "bond-like" stocks are less prone to be affected by market sentiment, they state the most difficult securities to value are those most difficult to arbitrage. I use their index to test for the effects of market sentiment on fixed income ETF pricing, and expect overall, that high market sentiment will increase fund flows and therefore, reducing premiums for securities that are more liquid.

Table 3.4 examines the correlations between premium, the dependent variable, and these measures of transaction costs (COST), illiquidity (ILM), flow factor (FLOW), momentum (MOM), volatility (VOL) and market sentiment (SENT). In line with expectations, Bond ETF's with higher transaction costs, illiquidity, momentum and volatility are associated with higher premium. As previous literature reports, the flow factor (e.g. Kalaycioughu, 2004; Ackert and Tian, 2008) and market sentiment are negatively related to premium. The highest correlation is transaction costs with illiquidity at 0.5163.

****Insert Table 3.4 about here****

As a robustness check, I run Granger Causality tests on each independent variable with premium (P). Table 3.5's Panels A through F report the most significant results

(using one lag). All the independent variables are Granger Causal for premium, but premium is not shown to be Granger Causal for these independent variables.

****Insert Table 3.5 about here****

3.5 EMPIRICAL RESULTS

Table 3.6 begins an analysis of cross sectional regressions for the complete sample of Bond ETFs funds. Each panel reports regression results for different study periods. Panel A studies the period 2002 through 2006, a time frame where there were a maximum of six Bond ETF funds in existence. Panel B focuses on January 1, 2007 - December 31, 2010, a period of significant increases in fixed income capital investment and numbers of Bond ETF funds. Panels C and D break down the Panel B 2007 -2010 timeframe into two periods: Panel C analyzes the period January 1, 2007 through September 14, 2008, a period before the fall of Lehman Brothers; Panel D reports results for the period of September 15, 2008 through December 31, 2010, allowing a study period with a significantly larger number sample, as well as a study of financial press reported periods of high premiums/discounts after the market's downturn in late 2008 and the market's resurgence since March 2009.

Results in Panel A of Table 3.6 reflect the analysis of the six Bond ETF funds that existed between 2002 and December 31, 2007. Transaction costs in each cross-sectional regression are all significant at the 1% confidence level. When regressed individually with transaction costs, illiquidity and volatility are positively related at the 5% confidence level, whereas fund flows are negatively correlated at the 5% level. Although negative, investor sentiment is not statistically significant in this time period. Adjusted R^2 ranges

from 14.56% to 19.71%. A collective analysis of the independent variables was not possible with an insufficient number of degrees of freedom.

Panel B of Table 3.6 analyzes the entire population of Bond ETF funds for the period 2007 through 2010. Again, transaction costs are significant in all regressions at the 1% confidence level, although the coefficients sizes are not as large when compared to the 2002 -2007 timeframe. This result would appear to indicate transaction costs are declining over time. Illiquidity, momentum, and volatility (again individually regressed with transaction costs in models 1 through 5) are all positively associated with premium at the 1% level. Sentiment is again negatively related, but its statistical significance has increased to 5%, (although with perhaps a economically insignificant coefficient (-0.0010)). Fund flow also remains negatively correlated, but now, perhaps due to the more recent increase in Bond ETF investment, statistically significant at 1%. Model 6's combined independent variable's cross-sectional regression has an adjusted R^2 of 17.12%, although momentum's statistical significance has reduced from 1% to 5%. Overall, as reflected by their higher coefficients as compared to Panel A's 2002 through 2007 period of study, the 2007 - 2010 timeframe shows illiquidity, fund flows, momentum, volatility and market sentiment to all have a more significant influence on premium.

Table 3.6's Panel C studies the period January 1, 2007 through September 14, 2008 to begin a comparison of the independent variables effects on premium before and after the fall of Lehman Brothers, generally regarded as the beginning of the financial crisis. Overall, the statistical significance of the independent variables are the same as those reported in Panel B's 2007 - 2010 results, with the exceptions of momentum, whose statistical significance drops from 5% to 10%. Overall, results show the coefficients for

transaction costs and volatility are smaller, appearing to reflect a less volatile period of study. Model 6's combined independent variable's cross-sectional regression has a higher adjusted R^2 of 19.78% (as compared to Panel B's 17.12%).

Panel D of Table 3.6 examines the September 15, 2008 through December 31, 2010 timeframe. Comparing results to Panel C's previous period of January 1, 2007 through September 14, 2008, the statistical significance of the independent variables are the same with the exceptions of momentum, whose statistical significance increase to 10% from 5% and market sentiment which decreases from 10% to 5%. When compared to the earlier time period, Model 6's combined independent variable's cross-sectional regression has a lower adjusted R^2 of 18.34% (as compared to the previous period's 19.78%). However, the later more volatile time period results in higher independent variables coefficients. When comparing models 1through 6 regressions results for the two periods, all the independent variables have larger effects on premium post September 14, 2008. This result supports the literature and this study's expectation that transaction costs, illiquidity, fund flows, momentum, volatility and market sentiment have a more significant impact on mispricing during periods of more fund flows, illiquidity and market volatility.

****Insert Table 3.6 about here****

Tables 3.7, 3.8, and 3.9 report 2007 - 2010 cross-sectional regression analysis results for the U.S. Treasury, aggregate, and corporate Bond ETF fund sectors respectfully. The high yield Bond ETF sector only had four funds in late 2010 which precludes a complete analysis.

Table 3.7 reports the cross sectional regression results for the Bond ETF U.S. Treasury fund sector from January 1, 2007 through December 31, 2010 to include 12 short term (1 to 3 year), 14 midterm, 14 long term (20+ years) and 6 Treasury inflation protected (TIPS) security funds. Although all independent variables have the expected signs, results show transaction costs are the only statistically significant variable, which is at a 1% confidence level. Combined independent variable results in model 6 report an adjusted R^2 of 15.56%. These results appear to reflect the minimal spreads and average premiums/discounts reported in Table 3, and that U.S. Treasury securities, in general, experience less volatility and are very liquid.

****Insert Table 3.7 about here****

Table 3.8 reports estimates of the cross sectional regressions for the 9 aggregate Bond ETF fund sector from January 1, 2007 through December 31, 2010. Once again, all independent variables have the expected signs and transaction cost has the largest statistically significant coefficient (at 1% for each regression). When regressed with transaction costs, the three independent variables illiquidity, momentum, and volatility are all statistically significant at the 1% confidence level, with fund flow and market sentiment at 10%. Adjusted R^2 ranges from 17.73% to 19.54%. A collective analysis of the independent variables was not possible with an insufficient number of degrees of freedom.

****Insert Table 3.8. about here****

Table 3.9 reports results of the cross sectional regressions for the 28 investment grade corporate (to include municipals) Bond ETF fund sector from January 1, 2007 through December 31, 2010. All independent variables have the expected signs and are statistically significant. When regressed with transaction costs and collectively, the variables illiquidity and momentum are statistically significant at the 1% confidence level, with fund flow, volatility and market sentiment at 5%. Combined independent variable results in column 6 report an adjusted R^2 of 16.77%. Overall, when compared to the aggregate bond sector (Table 3.8) which would include U.S Treasuries and in line with previous results and expectations, this sector experiences higher transactions costs and illiquidity, fund flows, momentum and volatility have more impact on premium.

****Insert Table 3.9 about here****

Overall, cross-sectional regression results in Tables 3.7, 3.8 and 3.9, which focus on individual sectors, have more explanatory power than the combined results reported earlier in Tables 3.5 and 3.6. As the literature suggests, all this studies cross-sectional regression results show transaction costs to have the most significant impact on premium. Although to a lesser degree, illiquidity, fund flow, momentum, volatility and market sentiment also play a significant role in driving premiums in Bond ETF funds. There remain, however, significant unexplained average premiums, as the highest adjusted R^2 in these regressions is 19.63%.

3.6 CONCLUDING REMARKS

Since the market collapse of 2008, Bond ETF's have quickly become popular with investors as fear has driven them to safer and more reliable income investments and greed has them seeking large returns in high yield bonds to make up for huge losses in stock.

Over the period of 2007 - 2010 results reveal significant (far exceeding the average 5 to 25 basis point premium found in equity ETFs) premiums for all Bond ETF sectors other than U.S. Treasuries, with aggregate ETF bond funds averaging a 63 basis point premium, a 151 basis point average premium in investment grade corporate Bond ETFs and an almost 2 full percentage point (199 basis points) average in high yield bond funds.

This study finds transaction costs, illiquidity, fund flow, momentum , volatility and market sentiment all have a statistically significant impact on premium, with larger impacts since September 14, 2008. However, large unexplained average premiums remain. These large and varied premiums may create significant trading costs for investors. Secondary market investors should be aware of these premiums and when the premiums are large, they should consider not transacting business.

The worst problems for Bond ETF's may be yet to come. If investors exit quickly from investment grade and high yield corporate Bond ETFs, massive selling could turn high ETF premiums into discounts and have an even more significantly negative effect on investor's returns.

CHAPTER 5

CONCLUSIONS

This dissertation examines the characteristics and relative performance of foreign reverse mergers (RMs) that occur on U.S stock exchanges as well as the arbitrage system in place for Bond ETFs. It contributes to the literature in multiple ways.

The first essay is the only study to date that focuses on the foreign firms that use RMs as a mechanism for going public in the U.S.. This topic is worthwhile given the rapid increase in popularity of RMs and the growing interest in foreign market investment. Specifically, the study focuses on Chinese RMs, which have accounted for over 63% of RMs into the U.S. since 2008 and have attracted significant attention in the financial media. This is the first research that analyzes foreign firms' characteristics and operating performance prior to coming the U.S. and after being listed on a U.S. stock exchange. Results indicate Chinese firms that engage in RMs are, on average, private firms not listed in China, motivated by the ability to offer equity based compensation (which has been illegal in China), seek quick infusions of capital, grow assets in the U.S. very quickly relative to U.S. RMs (which may indicate a motivation to move assets out of China), and experience significantly better short and long term performance (particularly when using PIPES) when compared to benchmarks that include cross-listed Chinese firms (a modified Halter USX CHINA index), the Russell 2000 and U.S. RMs. The evidence also shows Chinese and U.S. RMs that use PIPES experience higher returns and survival rates, however U.S. RM's, overall, have a higher rate of survival in the first two

year period. In summary, although RMs appear to involve considerable risk, both Chinese and U.S. RM's generate positive long-term performance for shareholders of the new entity.

Using the entire U.S Bond ETF sample since they were introduced in 2002, the second essay is the first to study the factors that influence Bond ETF premiums/discounts and the ETF Authorized Participants (APs) ability and/or inclination to arbitrage Bond ETF mispricing. As the fixed income ETF market continues to expand, it is important for investors to understand pricing and trading behavior to help achieve more efficient execution. Results reveal Bond ETF premiums, on average, significantly exceed those found in equity ETFs premiums for all Bond ETF sectors other than U.S. Treasuries, with aggregate ETF bond funds averaging a 63 basis point premium, a 151 basis point average premium in investment grade corporate Bond ETFs and an almost 2 full percentage point (199 basis points) average in high yield bond funds. This study finds transaction costs, illiquidity, fund flow, momentum, volatility and market sentiment all have a statistically and economically significant impact on premium, particularly since the financial crisis of 2008. However, significant unexplained average premiums remain. These large and varied premiums may create significant trading costs for investors. Secondary market investors should be aware of these premiums and when the premiums are large, they should consider not transacting business.

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Table 2.1. All Reverse Mergers in the U. S. markets by target country 2008 - 2010

This table reports the number of reverse mergers by quarter that took place in the exchange markets of the United States from January 1, 2008 through December 31, 2010 compiled from PrivateRaise/D. F. M.'s data base. The column United States reports the number of reverse mergers that took place between two U.S. participants. The China column reports the number of reverse mergers where a Chinese company was the target company. Foreign (non-China) transactions are those where a non-Chinese foreign firm was the target company.

Year/Quarter	United States	China	Foreign (non-China)	Totals
2008-Q1	38	14	8	60
2008-Q2	36	16	6	58
2008-Q3	31	19	6	56
2008-Q4	28	18	4	50
2008 Total	133	67	24	224
2009-Q1	27	11	5	43
2009-Q2	30	10	7	47
2009-Q3	36	11	10	57
2009-Q4	64	21	14	99
2009 Total	157	53	36	246
2010-Q1	48	25	7	80
2010-Q2	39	26	17	82
2010-Q3	38	20	3	61
2010-Q4	25	17	9	51
2010 Total	150	88	36	274
Totals	**440**	**208**	**96**	**744**

Table 2.2. Chinese and U.S. reverse mergers summary statistics 2008- 2010

This table reports the summary statistics comparing Chinese RMs to U.S. RMs with and without PIPES for the period January 1, 2008 - December 31, 2010 compiled from PrivateRaise/D. F. M.'s data base. Chinese RMs are those conducted between a Chinese firm being acquired by a U.S. firm and U.S. RMs are those conducted between two U.S. companies. PIPES are Private Investment in Public Equity.

	China	**U.S.**
Total Number of Reverse Merger Transactions:	208	440
Total Number of Reverse Merger + PIPE Transactions:	75 (36.06%)	184 (41.82%)
Total Dollars Raised in Reverse Merger + PIPE Transactions:	$547.9 M	$334.2 M
Average Dollars Raised in Reverse Merger + PIPE Transactions:	$7.3 M	$1.8 M

Table 2.3. Post-merger valuation summary statistics for Chinese and U.S. RMs 2008-2010

This table compares Chinese RM post-merger valuation summary statistics to U.S. RMs for the period January 1, 2008 - December 31, 2010 complied from PrivateRaise/D. F. M.s data base. Panel A compares the lowest, average and highest post-merger market capitalization valuations at the transaction's closing to the same values 4 weeks later. Panel B compares the lowest, average and highest post-merger stock prices at the transaction's closing to the same values 4 weeks later. Chinese RMs are those conducted between a Chinese firm being acquired by a U.S. firm and U.S. RMs are those conducted between two U.S. companies.

Panel A. Post-merger China and U.S. market capitalization comparisons

	China Market Cap			U.S. Market Cap		
Post-Merger Valuation Metrics	**Low**	**Average**	**High**	**Low**	**Average**	**High**
At Reverse Merger Closing(millions)	$0.1	$77.6	$697.2	$0.3	$52.3	$629.1
4-wk Post-Closing Stock Price(millions)	$0.1	$97.2	$971.0	$0.2	$58.1	$685.7
4-wk Post-Closing VWAP(millions)	$0.1	$90.2	$673.1	$0.2	$55.6	$687.1

Panel B. Post-merger China and U.S. stock price comparisons

	China Stock Price			U.S. Stock Price		
Post-Merger Valuation Metrics	**Low**	**Average**	**High**	**Low**	**Average**	**High**
At Reverse Merger Closing	0.01	2.53	33	0	2.33	16
4-wk Post-Closing Stock Price	0.01	2.84	24	0	2.23	15.31
4-wk Post-Closing VWAP	0.01	2.7	25.07	0	2.15	12.82

Table 2.4. Percentage ownership summary statistics for Chinese and U.S. RMs 2008-2010

This table compares Chinese RM percentage ownership summary statistics to U.S. RMs for the period January 1, 2008 - December 31, 2010 complied from PrivateRaise/D. F. M.'s data base. The lowest, average and highest ownership percentages are reported at the transaction's closing for reverse mergers with and without the use of PIPES. Chinese RMs are those conducted between a Chinese firm being acquired by a U.S. firm and U.S. RMs are those conducted between two U.S. companies. PIPES are Private Investment in Public Equity.

	China			U.S.		
Percentage Ownership Metrics	**Low**	**Average**	**High**	**Low**	**Average**	**High**
Percentage Issued in Share Exchange	0.00	85.20	100.00	1.30	72.30	100.00
Percentage Issued PIPE	0.10	33.10	517.40	0.10	35.70	2757.10
Percentage Issued in Share Exchange + PIPE	14.60	87.00	100.00	1.60	75.70	100.00

Table 2.5. Initial exchange listing summary statistics for Chinese and U.S. RMs 2008 - 2010

This table reports the number of Chinese and U.S. reverse mergers that take place on each U.S. exchanges at the time of the initial transaction, with and without the use of PIPES, for the period January 1, 2008 - December 31, 2010. The row designated Never Trade reports the number of transactions that are consummated but do not succeed in trading at any exchange. The data is compiled from PrivateRaise/D. F. M.'s data base. Chinese RMs are those conducted between a Chinese firm being acquired by a U.S. firm and U.S. RMs are those conducted between two U.S. companies. PIPES are Private Investment in Public Equity.

	China			U.S.		
Exchange	**Reverse Merger**	**Reverse Merger + PIPE**	**PIPE Total**	**Reverse Merger**	**Reverse Merger + PIPE**	**PIPE Total**
NASDAQ-GS	0	0	0.0 M	0	0	0.0 M
NASDAQ-GM	6	6	9.2 M	1	0	0.0 M
NASDAQ-CM	7	5	79.1 M	1	0	0.0 M
NYSE	1	1	11.8 M	1	0	0.0 M
OTC BB	159	48	351.8 M	375	169	317.3 M
OTC	9	0	0.0 M	37	6	11.2 M
Never Trade	25	15	92.5 M	25	9	5.8 M
Totals	208	75	544.4 M	440	184	334.2 M

Table 2.6. Initial industry distribution for Chinese and U.S. RMs with and without PIPE financing 2008 - 2010

This table reports the number of Chinese and U.S. reverse mergers that take place by industry at the time of the initial transaction, with and without the use of PIPES, for the period January 1, 2008 - December 31, 2010. The row designated Unknown reports the number of transactions that did not report their industry in SEC filings. The data is compiled from PrivateRaise/D. F. M.'s data base and SEC filings. Chinese RMs are those conducted between a Chinese firm being acquired by a U.S. firm and U.S. RMs are those conducted between two U.S. companies. PIPES are Private Investment in Public Equity.

	China			U.S.		
Industry	**Reverse Merger**	**Reverse Merger + PIPE**	**PIPE Total**	**Reverse Merger**	**Reverse Merger + PIPE**	**PIPE Total**
Basic Materials	19	12	120.3 M	24	13	7.9 M
Consumer/Retail	61	29	153.5 M	48	17	25.2 M
Energy	12	6	55.1 M	69	30	62.6 M
Financial Institutions	3	0	0.0 M	15	4	0.9 M
Healthcare	30	5	56.1 M	56	20	63.8 M
Industrial	31	6	67.8 M	96	54	52.3 M
Media	7	1	5.4 M	39	9	25.4 M
Real Estate	4	1	11.1 M	5	1	0.5 M
Technology	34	12	36.5 M	74	31	72.2 M
Telecommunications	3	2	21.9 M	15	4	10.5 M
Unknown	4	2	20.3 M	1	1	13.0 M
Totals	208	75	547.9 M	440	184	334.2 M

Table 2.7. Summary statistics for Chinese cross-listed and Chinese RM companies

This table reports summary statistics for the Chinese reverse merger and the Chinese cross-listed firms that comprised the China Halter Index on December 31, 2009. The data was hand collected from SEC filings. The number of observations varies based on data availability.

	TOTAL ASSETS		TOTAL DEBT		TOTAL CASH		SHARES OUTSTANDING		REVENUE (millions)	
	Cross Listed	Rev Merger	Cross Listed	Rev Merger	Cross Listed	Rev Merger	Cross Listed	Rev Merger	Cross Listed	Rev Merger
Mean	8.28 Billion	86.45 million	13.8 Billion	22.27 mill	980 mill	27.18 mill	145.21	37.14	701.00	93.85
Median	365,000,000	51,705,500	20,540,000	4,410,000	1.51E+08	7.17E+06	50.12	27.61	284.00	58.05
Maximum	2.12E+11	7.74E+08	3.41E+10	4.73E+08	4.76E+10	2.38E+03	4010.00	190.77	2620.00	875.92
Minimum	20023000	1.00E+03	0	0	3,990,000	2,380	8.03	3.27	6.10	-157.40
Std. Dev.	3.10E+10	1.17E+08	5.03E+09	5.36E+07	4.66E+09	8.38E+07	434.0837	31.48386	31800000	133.02
Observations	123	186	123	186	123	186	123	186	123	186

	OPERATING CASH FLOW		MARKET CAP		% INSTITUTIONAL STOCK		% INSIDER STOCK		DEBT/EQUITY RATIO	
	Cross Listed	Rev Merger	Cross Listed	Rev Merger	Cross Listed	Rev Merger	Cross Listed	Rev Merger	Cross Listed	Rev Merger
Mean	2.5 billion	7.7 million	8,320	96.24	22.60	12.37	26.80	46.00	56.87	69.66
Median	25870000	2320000	394	46.69	13.30	8.85	18.47	44.47	25.07	22.65
Maximum	4.70E+10	4.22E+08	23,600	836.58	96.50	52.80	95.09	95.87	705.78	2299.61
Minimum	-3.54E+08	-2.81E+08	62.18	3.50	0.20	0.10	0.03	0.11	0.04	0.05
Std. Dev.	8.30E+09	4.35E+07	3.25E+10	127.76	22.28	12.63	25.91	21.55	99.33	213.29
Observations	123	186	123	186	73	82	71	93	123	186

	# EMPLOYEES		BETA		AVERAGE VOLUME	
	Cross Listed	Rev Merger	Cross Listed	Rev Merger	Cross Listed	Rev Merger
Mean	20,378	733	1.55	1.86	762,913	139,082
Median	2,420	364	1.36	1.40	272,559	25,100
Maximum	539,168	7,105	4.28	16.12	10,899,900	987,694
Minimum	120	3	-0.16	-5.02	5,756	8
Std. Dev.	71153.84	1146.4	0.84	0.95	1567919	227831
Observations	116	170	103	136	123	186

Table 2.8. Chinese and U.S. reverse merger performance comparison of transactions with and without PIPE financing

This table reports the mean buy and hold abnormal returns (BHRs) for various event windows for the entire sample of Chinese and U.S. RM's. The total sample varies by year for each set as noted in column N. The Chinese RM's results reflect performance for the period January 1, 2004 through December 31, 2010. The U.S. RM's results reflect performance for the period January 1, 2008 through December 31, 2010. The stocks are equally valued and the BHRs represent the cumulative market change over the relevant event window. Panel A reflects results for those firms that do not issue PIPES and panel B depicts results for those firms that use PIPES. The data was compiled from PrivateRaise/D. F. M.'s database as well as SEC filed 8-K/As, 8-Ks, 10Ks, SC-14F1s, Bloomberg and Yahoo Finance. Chinese RMs are those conducted between a Chinese firm being acquired by a U.S. firm and U.S. RMs are those conducted between two U.S. companies. PIPES are Private Investment in Public Equity. DNA -Data Not Available. ***, **, * represent significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Reverse mergers performance without PIPE financing

	China			U.S.		
Event Window	**N**	**BHR**	***t*-statistic**	**N**	**BHR**	***t*-statistic**
[-30, -1]	212	9.61	2.66***	244	4.77	4.44***
[0, +1]	212	14.66	3.24***	244	1.96	2.07**
[0, +3]	212	15.39	3.32***	244	2.34	2.43**
[0, +7]	212	16.44	3.65***	244	1.45	2.08**
[0, +14]	212	14.56	3.46***	244	-2.54	2.02**
[0, +30]	212	12.22	4.31***	244	-3.78	2.12**
[-30,+60]	212	21.22	4.67***	244	1.54	2.07**
[0, +90]	212	11.78	4.43***	244	-2.76	2.09**
[0, +180]	193	15.33	3.91***	233	2.37	2.18**
[0, +1 yr]	138	18.94	3.05***	146	3.24	2.74***
[0, +2 yr]	104	22.45	3.64***	59	4.56	2.64***
[0, +3 yr]	76	23.86	3.02***	DNA	DNA	DNA
[0, +4 yr]	36	33.24	2.38**	DNA	DNA	DNA

Panel B. Reverse mergers with PIPE financing

	China			U.S.		
Event Window	**N**	**BHR**	***t*-statistic**	**N**	**BHR**	***t*-statistic**
[-30, -1]	122	16.44	2.84***	177	12.68	3.15***
[0, +1]	122	22.20	3.26***	177	11.84	2.87***
[0, +3]	122	30.45	3.77***	177	13.81	2.93***
[0, +7]	122	33.26	3.86***	177	14.79	3.12***
[0, +14]	122	29.63	3.53***	177	15.92	3.21***
[0, +30]	122	27.65	3.28***	177	14.62	3.33***
[-30,+60]	122	45.43	4.14***	177	26.56	3.42***
[0, +90]	122	31.53	3.87***	177	12.41	3.77***
[0, +180]	119	38.89	2.94***	172	10.58	2.83***
[0, +1 yr]	98	33.51	3.13***	126	9.59	2.71***
[0, +2 yr]	77	34.77	2.62***	65	9.11	2.54**
[0, +3 yr]	67	37.42	2.11**	DNA	DNA	DNA
[0, +4 yr]	41	44.32	2.22**	DNA	DNA	DNA

Table 2.9. Survival and listing migration summary statistics for Chinese and U.S. reverse mergers

This table reports the survival rates and listing status changes for the full sample of Chinese and U.S. RM's. The total sample varies by year for each set. Panel A reflects the survival rates for all Chinese RM's that took place between January 1, 2004 through December 31, 2010 and the U.S. RM's that took place between January 1, 2008 and December 31, 2010. Panel B reflects any changes in listing status for both groups during their first two years. Panel C reflects the different reasons that the RM's in both groups did not survive. The data was compiled from PrivateRaise/D. F. M.'s database as well as SEC filed 8-K/As, 8-Ks, 10Ks, SC-14F1s, Bloomberg and Yahoo Finance. Chinese RMs are those conducted between a Chinese firm being acquired by a U.S. firm and U.S. RMs are those conducted between two U.S. companies.

	China	U.S.
Panel A. Survival		
2 years post RM	181 of 272 (66.54%)	124 of 133 (93.23%)
3 years post RM	143 of 198 (72.22%)	DNA
4 years post RM	77 of 112 (68.75%)	DNA
5 years post RM	49 of 76 (64.47%)	DNA
Panel B. Two Year Listing Status		
No change	239 (60.97%)	413 (93.86%)
Higher	43 (10.97%)	4 (0.9%)
Lower	110 (28.06%)	23 (5.23%)
Total	392	440
Panel C. Non-surviving RMs		
Transacted another RM	5 (5.95%)	1 (4.0%)
Bankrupt	53 (63.1%)	16 (64.0%)
Acquisition	6 (7.14%)	3 (12.0%)
Went private	4 (4.76%)	2 (8.0%)
No data	16 (19.05%)	3 (12.0%)
Total	84	25

Table 2.10. Statistical summary and comparison of Chinese and U.S. financial characteristics 2008-2010

This table reports the median values for various financial characteristics of 208 Chinese and 440 U.S. RM's that took place between January 1, 2008 and December 31, 2010. Net profit margin is net income divided by sales. # of out shares is the number of outstanding shares. % Institute is the total percentage of institutional ownership. % Insiders is the total percentage of insider ownership. ($M) represents millions. The data was compiled from PrivateRaise/D. F. M.'s database as well as SEC filed 8-K/As, 8-Ks, 10Ks, SC-14F1s, Bloomberg and Yahoo Finance. Chinese RMs are those conducted between a Chinese firm being acquired by a U.S. firm and U.S. RMs are those conducted between two U.S. companies. p values are reported in brackets.

	Chinese	U.S.	Wilcoxon median z-test Statistic [p value]
Market Cap ($M)	96.8	57.6	4.18 [0.00]
Cash and equivalents ($M)	6.43	3.56	5.34 [0.02]
Total Assets ($M)	88.33	47.99	5.16 [0.00]
Debt/Equity Ratio	23.65	19.54	2.13 [0.04]
Revenue ($M)	63.02	47.92	3.57 [0.03]
Operating Cash Flow ($M)	2.32	2.04	0.74 [0.12]
Net Profit Margin %	1.24	1.03	0.54 [0.04]
Number of out shares ($M)	32.62	27.43	1.78 [0.30]
% Institute	7.11	4.22	4.63 [0.04]
% Insiders	85.82	36.48	1.65 [0.03]

Table 2.11. Financial characteristics of Chinese firms before consummating a reverse merger and a two year post-merger financial characteristic statistical summary comparison of Chinese and U.S. RMs

This table's first column reports the median values (in millions except for percentage measurements) for various financial characteristics of Chinese firms for the two years before they consummated an RM in the U.S.. Columns two, three, five and six compare the median values for the financial characteristics of the first and second years of both Chinese and U.S. RM's that took place between January 1, 2008 and December 31, 2010. Net profit margin is net income divided by sales. # of out shares is the number of outstanding shares. % Institute is the total percentage of institutional ownership. % Insiders is the total percentage of insider ownership. ($M) represents millions. The data was compiled from PrivateRaise/D. F. M.'s database as well as SEC filed 8-K/As, 8-Ks, 10Ks, SC-14F1s, Bloomberg and Yahoo Finance. Chinese RMs are those conducted between a Chinese firm being acquired by a U.S. firm and U.S. RMs are those conducted between two U.S. companies. p values are reported in brackets.

	(1) Chinese Firms 2 yr prior	(2) China Year 1	(3) U.S. Year 1	(4) Wilcoxon median z-test Statistic [p value]	(5) China Year 2	(6) U.S. Year 2	(7) Wilcoxon median z-test Statistic [p value]
Market Cap ($M)	384.34	77.63	52.3	2.18 [0.02]	118.31	62.47	1.96 [0.00]
Cash/equivalents ($M)	26.52	4.31	3.1	0.47 [0.05]	5.42	3.4	1.58 [0.05]
Total Assets($M)	367.38	87.66	49.72	1.98 [0.04]	124.41	53.69	2.03 [0.00]
Debt/Equity Ratio	32.37	53.27	47.65	0.56 [0.06]	56.43	49.57	0.77 [0.05]
Revenue ($M)	331.92	59.43	58.45	0.32 [0.09]	66.89	62.33	0.64 [0.08]
Op Cash Flow($M)	9.56	2.45	2.64	0.39 [0.05]	3.28	2.77	0.47 [0.06]
Net Profit Margin %	4.43	0.653	1.44	1.65 [0.03]	1.16	1.61	0.73 [0.04]
# of out shares	n/a	22.77	21.76	0.25 [0.34]	27.65	22.48	0.82 [0.56]
% Institute	n/a	5.56	1.3	2.34 [0.02]	7.34	1.6	2.24 [0.01]
% Insiders	n/a	87.3	78.68	0.94 [0.05]	83.64	74.32	0.28 [0.07]
ROA%	1.33	0.75	3.75	2.64 [0.01]	0.83	4.08	3.25 [0.00]
ROE%	1.46	0.81	3.83	2.51 [0.00]	1.08	4.26	3.63 [0.00]

Table 2.12. Impact of Chinese reverse merger characteristics on firm performance

This table reports the regression results for the impact of various factors on the performance (R_{it}) of the 236 Chinese reverse mergers that survive one year during the sample period of January 1, 2004 through December 31, 2010. The following model is estimated:

$$R_{it} = a + \beta_1 SIZE_{it} + \beta_2 CASH_{it} + \beta_3 ROA_{it} + \beta_4 ROE_{it} + \beta_5 IND_{it} + \beta_6 EQUITY_{it} + \beta_6 PIPE_{it} + \varepsilon_{it}$$

The independent variables are defined as follows: SIZE is the log of total assets. CASH is cash and equivalents used to control for liquidity constraints. Return on equity (ROE) and return on assets (ROA) control for profitability. Models 1,2 and 3 report the significance of each of the three dummy variables which are equal to 1 if the RM participants are in the same industry (IND) (these results are for the basic materials industry, which had the highest coefficient), participate in PIPE financing (PIPE) or have some form of equity based compensation (EQUITY). Values are 0 otherwise. t-statistics are shown in parentheses. ***, **, * represent significance at the 1%, 5%, and 10% levels, respectively.

	Model 1	**Model 2**	**Model 3**
Intercept	0.0045 (2.31)***	0.0048 (2.22)***	0.0047 (2.36)***
SIZE	0.0046 (2.33)***	0.0044 (2.42)***	0.0046 (2.47)***
CASH	0.0066 (2.88)***	0.0069 (2.91)***	0.0067 (2.90)***
ROA	0.0003 (0.83)	0.0002 (0.84)	0.0006 (0.86)
ROE	0.0006 (0.93)	0.0007 (0.96)	0.0006 (0.94)
IND	0.0001 (0.07)		
EQUITY		0.0038 (2.55)***	
PIPE			0.0074 (2.97)***
R^2	0.1436	0.1567	0.2267
F-statistic	2.57***	2.69***	2.78***
# observations	236	236	236

Table 2.13. A comparison of Chinese reverse merger performance to benchmarks 2008 -2010

This table reports the average calendar year returns for the cross-listed Chinese firms that comprise the Halter USX CHINA index, the Russell 2000 and this study's entire sample of U.S. and Chinese RMs over the three year period 2008-2010. Chinese RMs are those conducted between a Chinese firm being acquired by a U.S. firm and U.S. RMs are those conducted between two U.S. companies. Historical returns for the Russell Investments and the Halter Index websites were collected from their respective websites.

	2008	**2009**	**2010**
U.S. reverse mergers	3.13	4.57	4.62
Chinese cross-listed firms	-69.36	33.46	9.56
Russell 2000	-34.8	25.2	25.3
Chinese reverse mergers	8.54	35.43	21.54

Table 3.1. 2009 growth and premium/discount summary data for four financial media highlighted Bond ETFs

This table reports growth and premium/discount summary data for the four financial media highlighted Bond ETFs in this study: 1) US iShares iBoxx High Yield Corporate Bond Fund (HYG), 2) US iShares Barclays 1-3 Year Credit Bond Fund (symbol CSJ), 3) U.S. Vanguard Total Bond Fund ETF (symbol BND and 4) US SPDR Barclays Capital High Yield Bond ETF (symbol JNK). The data reflects the four funds' increases in the number and growth of outstanding shares as well as the highest, lowest and mean premiums. US Vanguard Total Bond Market ETF (symbol BND) and US SPDR Barclays Capital High Yield Bond ETF (symbol JNK) began trading in 2009.

Bond ETF	HYG	CSJ	BND	JNK
Outstanding Shares Growth During 2009 (mill)	19.1	35.4	8.3	52.8
Outstanding Shares Percentage Growth 2009	77%	416%	488%	44
Outstanding Shares (millions) Jan 2, 2009	24.8	8.5	1.7	23.4
Outstanding Shares (millions) Dec 31, 2009	49.6	43.9	9.9	78.6
Minimum Percentage Premium 2009	-3.2%	.7%	-3.1%	-2.0%
Maximum Percentage Premium 2009	12.8%	4.9%	13.5%	9.1%
Mean Premium Percentage 2009	1.8%	2.2%	1.6%	1.5%

Table 3.2. 2009 descriptive statistics for four financial media highlighted Bond ETFs

This table reports summary data for the four financial media highlighted Bond ETFs in this study: 1) US iShares iBoxx High Yield Corporate Bond Fund (HYG), 2) US iShares Barclays 1-3 Year Credit Bond Fund (symbol CSJ), 3) U.S. Vanguard Total Bond Fund ETF (symbol BND) and 4) US SPDR Barclays Capital High Yield Bond ETF (symbol JNK). OUTSHARES is the total number of outstanding shares, PREMIUM is the premium/discount, NAV is the net asset value, LAST PRICE is the closing price of the ETF fund and SPREAD is the dollar difference between the market price and net asset value (NAV). US Vanguard Total Bond Market ETF (symbol BND) and US SPDR Barclays Capital High Yield Bond ETF (symbol JNK) began trading in 2009.

Panel A. US iShares iBoxx High Yield Corporate Bond Fund (HYG)

	OUTSHARES	PREMIUM	NAV	LASTPRICE	SPREAD
Mean	40.02870	2.007696	76.66138	78.17041	0.044043
Median	42.90000	1.812500	76.73905	78.37000	0.085000
Maximum	49.60000	12.76100	86.00420	87.00000	3.660000
Minimum	24.80000	-3.232000	63.60000	61.64000	-3.280000
Std. Dev.	7.145234	1.963649	6.300968	6.192640	0.945868
Skewness	-0.497907	1.164421	-0.201747	-0.427978	-0.244426
Kurtosis	1.724602	8.917649	1.935171	2.387225	5.242225
Jarque-Bera	25.09190	387.5698	12.42640	10.61981	50.47110
Probability	0.000004	0.000000	0.002003	0.004942	0.000000
Sum	9206.600	461.7700	17632.12	17979.19	10.13000
Sum Sq. Dev.	11691.45	883.0048	9091.802	8781.873	204.8788
Observations	259	259	259	259	259

Panel B. US iShares Barclays 1-3 Year Credit Bond Fund (symbol CSJ)

	OUTSHARES	PREMIUM	NAV	LASTPRICE	SPREAD
Mean	23.68435	2.160591	100.1577	102.3103	0.016260
Median	22.05000	2.189000	100.2186	102.9967	0.035000
Maximum	43.90000	4.923000	103.8028	104.6667	1.439900
Minimum	8.500000	0.690000	95.71260	97.25690	-1.090000
Std. Dev.	10.54233	0.832061	2.365260	2.042916	0.325910
Skewness	0.248624	0.422639	-0.164948	-0.809717	0.041362
Kurtosis	1.785654	3.040851	1.677580	2.508568	6.161594
Jarque-Bera	16.50146	6.863230	17.80225	27.44734	95.85747
Probability	0.000261	0.032335	0.000136	0.000001	0.000000
Sum	5447.400	496.9360	23036.26	23531.38	3.739900
Sum Sq. Dev.	25451.22	158.5425	1281.130	955.7330	24.32369
Observations	259	259	259	259	259

Panel C. U.S. Vanguard Total Bond Fund ETF (symbol BND)

	OUTSHARES	PREMIUM	NAV	LASTPRICE	SPREAD
Mean	57.09383	0.641740	77.38872	77.88288	0.007048
Median	56.80000	0.628000	77.10000	77.69000	0.030000
Maximum	76.40000	2.729000	80.13000	80.29000	1.350000
Minimum	38.30000	-0.076000	75.38000	75.92000	-0.800000
Std. Dev.	11.01273	0.338641	1.203346	1.070945	0.265778
Skewness	0.019935	1.755503	0.429859	0.269769	0.182031
Kurtosis	1.859178	10.55037	1.953154	1.968913	5.486904
Jarque-Bera	12.32482	655.7956	17.35605	12.80886	59.75049
Probability	0.002107	0.000000	0.000170	0.001654	0.000000
Sum	12960.30	145.6750	17567.24	17679.41	1.600000
Sum Sq. Dev.	27409.35	25.91713	327.2575	259.2046	15.96412
Observations	247	247	247	247	247

Panel D. US SPDR Barclays Capital High Yield Bond ETF (symbol JNK)

	OUTSHARES	PREMIUM	NAV	LAST_PRICE	SPREAD
Mean	51.65608	1.676461	33.61130	34.15886	0.027174
Median	52.00600	1.515000	34.07305	34.71700	0.062000
Maximum	78.62400	9.132000	38.27530	38.69000	1.170000
Minimum	23.40000	-2.464000	26.18590	25.85000	-1.580000
Std. Dev.	17.35342	1.561353	3.384324	3.306743	0.442172
Skewness	0.048564	1.282044	-0.331919	-0.476881	-0.782766
Kurtosis	1.584456	6.948634	1.915286	2.217480	4.776550
Jarque-Bera	19.29315	212.4266	15.49898	14.58584	53.73396
Probability	0.000065	0.000000	0.000431	0.000680	0.000000
Sum	11880.90	385.5860	7730.598	7856.537	6.250000
Sum Sq. Dev.	68961.31	558.2614	2622.886	2504.012	44.77327
Observations	248	248	248	248	248

Table 3.3. ETF average premium versus observed average range of underlying market bid/offer spread for identified Bond ETF sectors for the period 2007 - 2010

This table reports the average basis point (bps) premium/discount and underlying market bid/offer spread for the identified Bond ETF sectors over the period of January 1, 2007 through December 31, 2010. The categories include 12 short term (1 to 3 year) Treasuries, 14 midterm Treasuries, 14 long-term (20 + years) Treasuries, 6 U.S. Treasury inflation protected security (TIPS) funds, 9 aggregate bond funds, 28 investment-grade (to include municipals) corporate funds and 4 high yield funds.

Bond ETF Sector	Average Premium/Discount (bps)	Underlying bid/offer range
Short Term (1 to 3 yr) U.S. Treasuries	2	1.1–3.6
Midterm (5 to 15 yr) U.S. Treasuries	5	5.2 -16
Long Term (20 + yr) U.S. Treasuries	7	9–23
Treasury Inflation Protected Securities (TIPS)	39	20–40
Aggregate Bond Funds	63	28–85
Investment Grade Corporate	151	47–159
High Yield Bond Funds	199	107–310

Table 3.4. Correlations

This table reports the correlations among the Bond ETF premiums (discounts), transaction costs, illiquidity, flow factor, momentum and the volatility and marker sentiment indices. Transaction (share creation) costs are captured by the weighted average bid/offer spread observed in the underlying shares. Illiquidity is measured as the square root of the daily return divided by daily dollar volume. The flow factor is the level of supply and demand in the secondary market measured by the number of shares outstanding. Momentum is the natural log of the ratio of the fixed income ETF funds closing NAV on day *t* divided by the closing NAV on day *t - 1*. Near term market expectation of volatility is measured using the CBOE volatility Index (VIX). Market sentiment is measured using Baker and Wurgler's (2006) index.

	Transaction Costs	**Illiquidity**	**Flow factor**	**Momentum**	**Volatility**	**Market Sentiment**
Premium	0.2253	0.4286	-0.0179	0.0112	0.3187	-0.0067
Transaction costs	1.0	0.5163	-0.0013	0.0436	0.2975	-0.0004
Illiquidity	-	1.0	-0.0161	-0.0547	0.3648	-0.0055
Flow factor	-	-	1.0	0.0496	0.3491	0.0024
Momentum	-	-	-	1.0	0.3263	0.0046
Volatility	-	-	-	-	1.0	-0.0081

Table 3.5. Granger Causality Tests for independent variables and premium

This table reports Granger Causality Test results for the six independent variables relationship to premium (P). Panel A reports results for transaction costs (COST), Panel B for illiquidity (ILM), Panel C for fund flows (FLOW), Panel D for momentum (MOM), Panel E for volatility (VOL) and Panel F for market sentiment (SENT)

Panel A. Transaction costs (COST) and premium (P)

Dependent variable: D(COST)

Excluded	Chi-sq	Df	Prob
D(P)	0.175338	2	3.8722

Dependent variable: D(P)

Excluded	Chi-sq	Df	Prob
D(COST)	6.302451	2	0.0185

Panel B. Illiquidity (ILM) and premium (P)

Dependent variable: D(ILM)

Excluded	Chi-sq	Df	Prob
D(P)	0.108562	2	6.7833

Dependent variable: D(P)

Excluded	Chi-sq	Df	Prob
D(ILM)	9.754812	2	0.0015

Panel C. Fund flow (FLOW) and premium (P)

Dependent variable: D(FLOW)

Excluded	Chi-sq	Df	Prob
D(P)	0.354477	2	2.7124

Dependent variable: D(P)

Excluded	Chi-sq	Df	Prob
D(FLOW)	7.21356	2	0.0124

Panel D. Momentum (MOM) and premium (P)			
Dependent variable: D(MOM)			
Excluded	**Chi-sq**	**Df**	**Prob**
D(P)	0.106832	2	8.7367

Dependent variable: D(P)			
Excluded	**Chi-sq**	**Df**	**Prob**
D(MOM)	4.264901	2	0.0368

Panel E. Volatility (VOL) and premium (P)			
Dependent variable: D(VOL)			
Excluded	**Chi-sq**	**Df**	**Prob**
D(P)	0.148839	2	4.7153

Dependent variable: D(P)			
Excluded	**Chi-sq**	**Df**	**Prob**
D(VOL)	5.264901	2	0.0033

Panel F. Market sentiment (SENT) and premium (P)			
Dependent variable: D(SENT)			
Excluded	**Chi-sq**	**Df**	**Prob**
D(P)	0.133532	2	5.9592

Dependent variable: D(P)			
Excluded	**Chi-sq**	**Df**	**Prob**
D(SENT)	7.521853	2	0.0164

Table 3.6. Impact of independent variables on premium for all Bond ETFs funds

This table reports estimates of cross sectional regressions for the complete sample of Bond ETFs funds. Each panel reports regression results for different study periods as follows: Panel A for the period 2002 through 2006; Panel B focuses on January 1, 2007 - December 31, 2010; Panel C analyzes the period January 1, 2007 through September 14, 2008, a period before the fall of Lehman Brothers; Panel D reports results for the period of September 15, 2008 through December 31, 2010. Bond ETF premiums (discounts) are the dependent variable (P_{it}), defined as the difference in the Bond ETF price and the fund's NAV, divided by the NAV. Specifically, the following model is estimated:

$$P_{it} = a + \beta_1 COST_{it} + \beta_2 ILM_{it} + \beta_3 FLOW_{it} + \beta_4 MOM_{it} + \beta_5 VOL_{it} + \beta_6 SENT_{it} + \varepsilon_{it}$$

The independent variables are defined as follows: transaction costs (COST) are captured by the weighted average bid/offer spread observed in the underlying shares, illiquidity (ILM) measured as the square root of the daily return divided by daily dollar volume, a flow factor (FLOW) measuring the level of supply and demand in the secondary market by the number of shares outstanding, momentum (MOM) as the natural log of the ratio of the fixed income ETF funds closing NAV on day t divided by the closing NAV on day t - 1, near term market expectation of volatility (VOL) as measured by the CBOE volatility index and market sentiment (SENT) measured using Baker and Wurgler's (2006) index. The t-statistics are reported in parentheses below the coefficient estimates. The bottom rows of each column report adjusted R^2 and the F-statistic for a null hypothesis test that the intercept and all slope coefficients are equal to zero. N is the number of funds in that time period. ***, **, * represent significance at the 1%, 5%, and 10% levels, respectively.

Panel A. All Bond ETF Funds 2002 - December 31, 2007

	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	0.0270***	0.0277***	0.0273***	0.0274***	0.0279***
	(6.52)	(6.81)	(6.64)	(6.72)	(6.93)
COST	0.0347***	0.0283***	0.0345***	0.0319***	0.0327***
	(5.94)	(6.28)	(6.66)	(7.35)	(6.66)
ILM	0.0121**				
	(4.84)				
FLOW		-0.0026**			
		(3.88)			
MOM			0.0112*		
			(2.82)		
VOL				0.0148**	
				(4.62)	
SENT					-0.0006
					(1.86)
Adj. R^2	0.1971	0.1604	0.1756	0.1686	0.1456
F-stat	19.77***	18.93***	20.03***	20.44***	18.37***
N	6	6	6	6	6

Panel B. All Bond ETF funds January 1, 2007 - December 31, 2010

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	0.0263***	0.0266***	0.0253***	0.0251***	0.0268***	0.0259***
	(4.38)	(4.44)	(4.24)	(4.12)	(4.57)	(4.31)
COST	0.0338***	0.0272***	0.0298***	0.0311***	0.0295***	0.0227***
	(5.44)	(4.28)	(4.66)	(5.39)	(4.36)	(2.96)
ILM	0.0194***					0.0216***
	(5.26)					(4.61)
FLOW		-0.0065***				-0.0044***
		(4.91)				(3.87)
MOM			0.0184***			0.0118**
			(3.62)			(2.17)
VOL				0.0208***		0.0135***
				(5.27)		(3.71)
SENT					-0.0010**	-0.0008**
					(2.29)	(2.14)
Adj. R^2	0.1668	0.1513	0.1835	0.1954	0.1447	0.1712
F-stat	18.12***	17.22***	16.03***	19.12***	16.88***	16.79***
N	57	57	57	57	57	57

Panel C. All Bond ETF funds January 1, 2007 - September 14, 2008

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	0.0277***	0.0286***	0.0273***	0.0271***	0.0282***	0.0263***
	(4.65)	(4.71)	(4.60)	(4.58)	(4.68)	(4.56)
COST	0.0321***	0.0292***	0.0308***	0.0319***	0.0294***	0.0224***
	(5.28)	(4.20)	(4.93)	(5.27)	(4.81)	(2.96)
ILM	0.0265***					0.0204***
	(5.83)					(4.72)
FLOW		-0.0092***				-0.0083***
		(4.51)				(3.44)
MOM			0.0191***			0.0107*
			(4.27)			(1.91)
VOL				0.0188***		0.0111***
				(5.34)		(3.38)
SENT					-0.0012**	-0.0005**
					(2.52)	(2.09)
Adj. R^2	0.1644	0.1507	0.1812	0.1921	0.1613	0.1978
F-stat	18.77***	17.05***	19.07***	19.62***	16.55***	17.45***
N	39	39	39	39	39	39

Panel D. All Bond ETFs September 15, 2008 - December 31, 2010

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	0.0233***	0.0236***	0.0238***	0.0231***	0.0243***	0.0235***
	(5.21)	(5.29)	(5.33)	(5.18)	(5.47)	(5.26)
COST	0.0333***	0.0302***	0.0327***	0.0296***	0.0302***	0.0231***
	(5.32)	(4.38)	(4.98)	(5.27)	(4.93)	(3.08)
ILM	0.0278***					0.0226***
	(5.99)					(4.56)
FLOW		-0.0107***				-0.0091***
		(4.72)				(3.52)
MOM			0.0223***			0.0124**
			(4.53)			(2.03)
VOL				0.0212***		0.0144***
				(5.34)		(3.59)
SENT					-0.0018**	-0.0009*
					(2.33)	(1.98)
Adj. R^2	0.1844	0.1763	0.1733	0.1893	0.1427	0.1834
F-stat	16.88***	17.90***	14.57***	14.43***	17.04***	16.88***
N	68	68	68	68	68	68

Table 3.7. Impact of independent variables on premium for the U.S. Treasury Bond ETF sector 2007 - 2010

This table reports estimates of cross sectional regressions for the Bond ETF U.S. Treasury fund sector from January 1, 2007 through December 31, 2010 to include short term (1 to 3 year), midterm, long term (20+ years) and Treasury inflation protected (TIPS) security funds. The sector's ETF premiums (discounts) are the dependent variable (P_{it}), defined as the difference in the ETF price and the fund's NAV, divided by the NAV. Specifically, the following model is estimated:

$$P_{it} = a + \beta_1 COST_{it} + \beta_2 ILM_{it} + \beta_3 FLOW_{it} + \beta_4 MOM_{it} + \beta_5 VOL_{it} + \beta_6 SENT_{it} + \varepsilon_{it}$$

The independent variables are defined as follows: transaction costs (COST) are captured by the weighted average bid/offer spread observed in the underlying shares, illiquidity (ILM) measured as the square root of the daily return divided by daily dollar volume, a flow factor (FLOW) measuring the level of supply and demand in the secondary market by the number of shares outstanding, momentum (MOM) is the natural log of the ratio of the fixed income ETF funds closing NAV on day *t* divided by the closing NAV on day *t - 1*, near term market expectation of volatility (VOL) as measured by the CBOE volatility index and market sentiment (SENT) measured using Baker and Wurgler's (2006) index. The bottom rows of each column report adjusted R^2 and the F-statistic for a null hypothesis test that the intercept and all slope coefficients are equal to zero. N is the number of funds. The t-statistics are reported in parentheses below the coefficient estimates. ***, **, * represent significance at the 1%, 5%, and 10% levels, respectively.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	0.0111***	0.0113***	0.0106***	0.0107***	0.0108***	0.0096***
	(7.06)	(7.11)	(6.88)	(6.92)	(6.97)	(4.77)
COST	0.0153***	0.0134***	0.0144***	0.0189***	0.0173***	0.0125***
	(7.36)	(6.49)	(6.27)	(7.48)	(5.82)	(4.26)
ILM	0.0010					0.0002
	(0.65)					(0.51)
FLOW		-0.0005				-0.0003
		(0.72)				(0.63)
MOM			0.0006			0.0002
			(0.88)			(0.57)
VOL				0.0034		0.0011
				(1.57)		(1.44)
SENT					-0.0002	-0.0001
					(0.83)	(0.77)
Adj. R^2	0.1396	0.1148	0.1552	0.1476	0.1410	0.1556
F-stat	13.74***	12.42***	11.91***	10.43***	9.08***	11.01***
N	46	46	46	46	46	46

Table 3.8. Impact of independent variables on premium for the Aggregate Bond ETF Sector 2007-2010

This table reports estimates of cross sectional regressions for the aggregate Bond ETF fund sector from January 1, 2007 through December 31, 2010. The sector's ETF premiums (discounts) are the dependent variable (P_{it}), defined as the difference in the ETF price and the fund's NAV, divided by the NAV. Specifically, the following model is estimated:

$$P_{it} = a + \beta_1 COST_{it} + \beta_2 ILM_{it} + \beta_3 FLOW_{it} + \beta_4 MOM_{it} + \beta_5 VOL_{it} + \beta_6 SENT_{it} + \varepsilon_{it}$$

The independent variables are defined as follows: transaction costs (COST) are captured by the weighted average bid/offer spread observed in the underlying shares, illiquidity (ILM) is measured as the square root of the daily return divided by daily dollar volume, a flow factor (FLOW) measuring the level of supply and demand in the secondary market by the number of shares outstanding, momentum (MOM) is the natural log of the ratio of the fixed income ETF funds closing NAV on day *t* divided by the closing NAV on day *t - 1*, near term market expectation of volatility (VOL) is measured by the CBOE volatility index and market sentiment (SENT) is measured using Baker and Wurgler's (2006) index. The bottom rows of each column report adjusted R^2 and the F-statistic for a null hypothesis test that the intercept and all slope coefficients are equal to zero. N is the number of funds. The t-statistics are reported in parentheses below the coefficient estimates. ***, **, * represent significance at the 1%, 5%, and 10% levels.

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Intercept	0.0284***	0.0289***	0.0287***	0.0285***	0.0291***
	(5.98)	(6.12)	(6.08)	(6.01)	(6.17)
COST	0.0313***	0.0294***	0.0329***	0.0311***	0.0334***
	(5.88)	(5.79)	(5.97)	(5.26)	(5.86)
ILM	0.0212***				
	(6.74)				
FLOW		-0.0074*			
		(2.26)			
MOM			0.0166***		
			(4.85)		
VOL				0.0189***	
				(6.66)	
SENT					-0.0009*
					(2.22)
Adj. R^2	0.1954	0.1863	0.1922	0.1941	0.1773
F-stat	12.56***	11.84***	12.01***	12.43***	13.08***
N	9	9	9	9	9

Table 3.9. Impact of independent variables on premium for the Investment Grade Corporate Bond ETF Sector 2007 - 2010

This table reports estimates of cross sectional regressions for the investment grade corporate (to include municipals) Bond ETF fund sector from January 1, 2007 through December 31, 2010. The sector's ETF premiums (discounts) are the dependent variable (P_{it}), defined as the difference in the ETF price and the fund's NAV, divided by the NAV. Specifically, the following model is estimated for the period January 1, 2007 - December 31, 2010:

$$P_{it} = a + \beta_1 COST_{it} + \beta_2 ILM_{it} + \beta_3 FLOW_{it} + \beta_4 MOM_{it} + \beta_5 VOL_{it} + \beta_6 SENT_{it} + \varepsilon_{it}$$

The independent variables are defined as follows: transaction costs (COST) captured by the weighted average bid/offer spread observed in the underlying shares, illiquidity (ILM) measured as the square root of the daily return divided by daily dollar volume, a flow factor (FLOW) measuring the level of supply and demand in the secondary market by the number of shares outstanding, momentum (MOM) as the natural log of the ratio of the fixed income ETF funds closing NAV on day *t* divided by the closing NAV on day *t - 1*, near term market expectation of volatility (VOL) as measured by the CBOE volatility index and market sentiment (SENT) measured using Baker and Wurgler's (2006) index. The bottom rows of each column report adjusted R^2 and the F-statistic for a null hypothesis test that the intercept and all slope coefficients are equal to zero. N is the number of funds. The t-statistics are reported in parentheses below the coefficient estimates. ***, **, * represent significance at the 1%, 5%, and 10% levels, respectively.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	0.0242***	0.0243***	0.0241***	0.0240***	0.0244***	0.0239***
	(6.69)	(6.73)	(6.62)	(6.58)	(6.77)	(4.66)
COST	0.0336***	0.0342***	0.0314***	0.0328***	0.0348***	0.0267***
	(6.12)	(5.84)	(6.02)	(5.98)	(6.17)	(3.22)
ILM	0.0271***					0.0258***
	(6.96)					(5.19)
FLOW		-0.0089**				-0.0077**
		(2.31)				(2.23)
MOM			0.0185***			0.0165***
			(5.15)			(4.28)
VOL				0.0218**		0.0176***
				(6.71)		(5.43)
SENT					-0.0008**	-0.0005**
					(2.31)	(2.16)
Adj. R^2	0.1873	0.1716	0.1944	0.1963	0.1688	0.1677
F-stat	14.94***	14.04***	13.57***	15.71***	11.69***	13.76***
N	28	28	28	28	28	28

Figure 2.1. Number of Chinese reverse mergers by year 2004 - 2010

This fiqure plots the total of 442 Chinese RMs by year that were consumated between January 1, 2004 and December 31, 2010 compiled from PrivateRaise/D. F. M.'s data base.

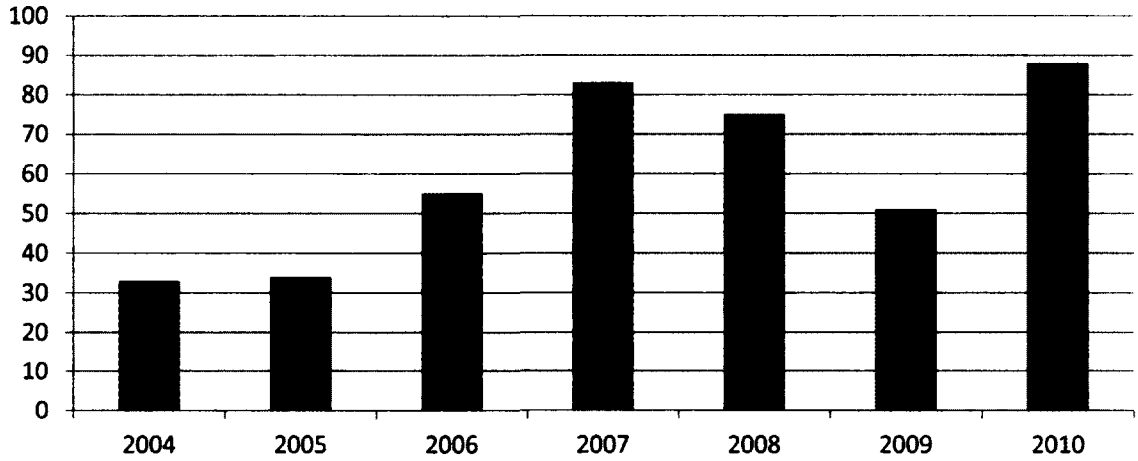


Figure 2.2. All Reverse Mergers in the U. S. markets by target country 2008 - 2010

This figure plots the number of reverse mergers consummated from January 1, 2008 through December 31, 2010 by quarter compiled from PrivateRaise/D. F. M.'s data base. The U.S. RM line plots the number of reverse mergers that took place between two U.S. participants. The China RM line plots the number of reverse mergers where a Chinese company was the target company. Foreign (non-China) transactions are those where a non-Chinese foreign firm was the target company.

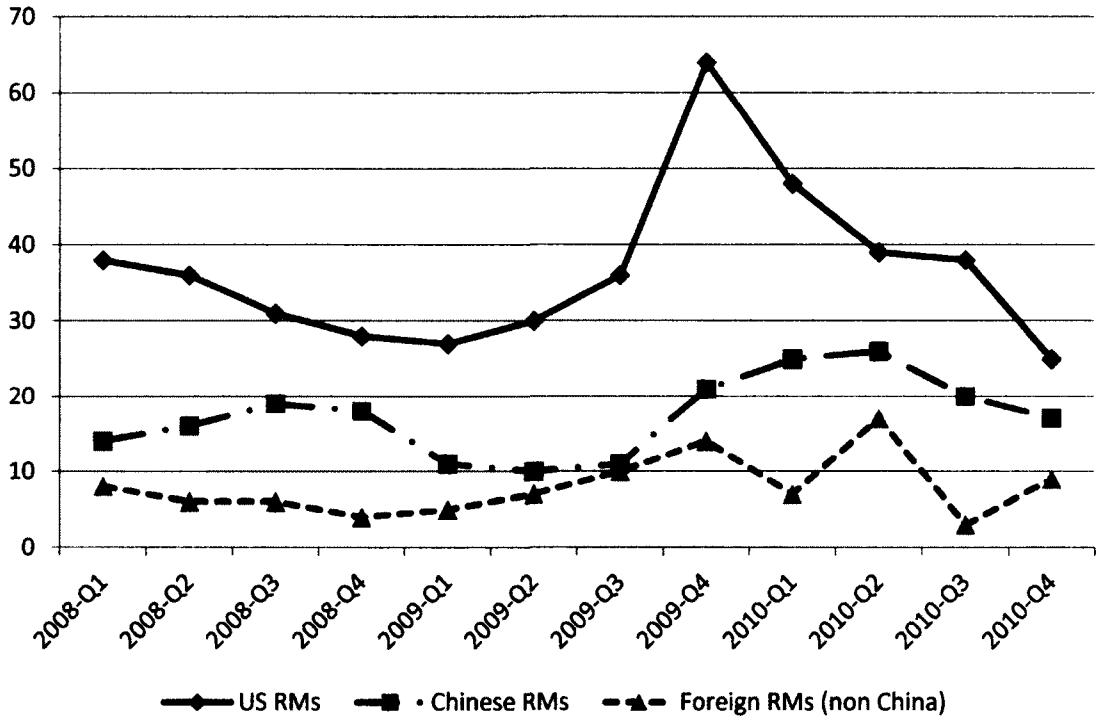


Figure 2.3. Reverse merger [-30 day, +30 day] returns comparison of Chinese and U.S. RMs

This chart plots the average buy and hold returns for the 30 days prior to the RM consummation to 30 days afterward for the 183 Chinese RMs and 425 U.S. RMs that traded stock and took place between January 1, 2008 and December 31, 2010. Chinese RMs are those conducted between a Chinese firm being acquired by a U.S. firm and U.S. RMs are those conducted between two U.S. companies. The data was compiled from PrivateRaise/D. F. M.'s database as well as Bloomberg and Yahoo Finance.

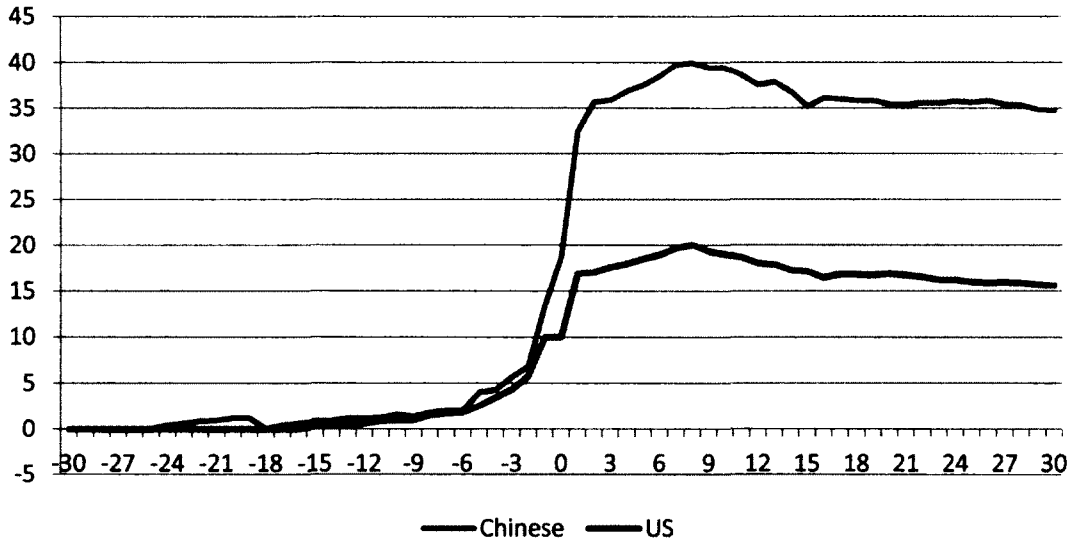


Figure 3.1. Total number of fixed income ETFs by year 2002 - 2010

This figure plots the total number of fixed income ETFs that existed in the U.S. markets in each calendar year from 2002 through 2010. The data was collected from the Wall Street Journal April 11, 2011.

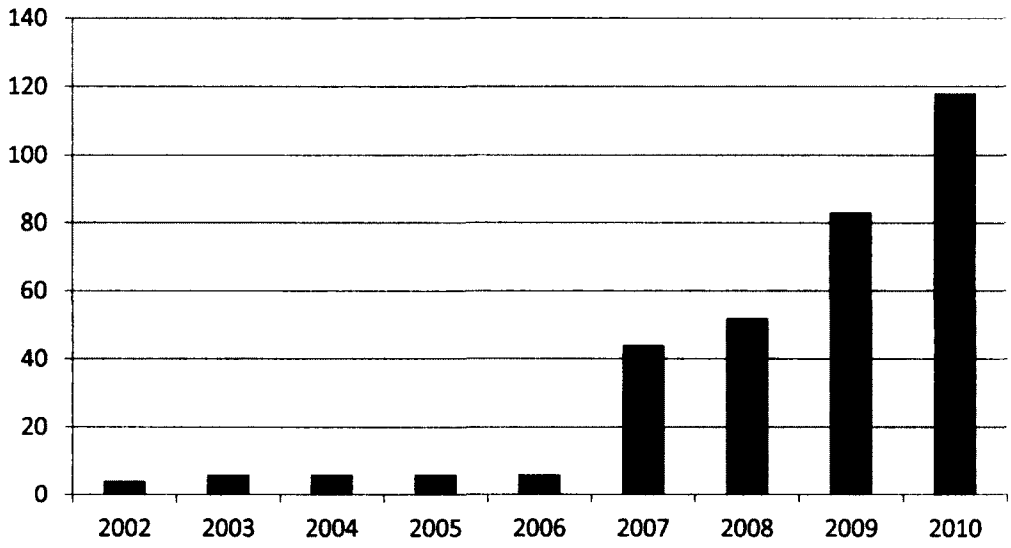


Figure 3.2. Total fixed income ETF investment 2002 - 2010

This figure plots the total investment in fixed income (bond) ETFs (in billions) for each calendar year from January 1, 2002 through December 31, 2010. The data was collected from the Wall Street Journal April 11, 2011.

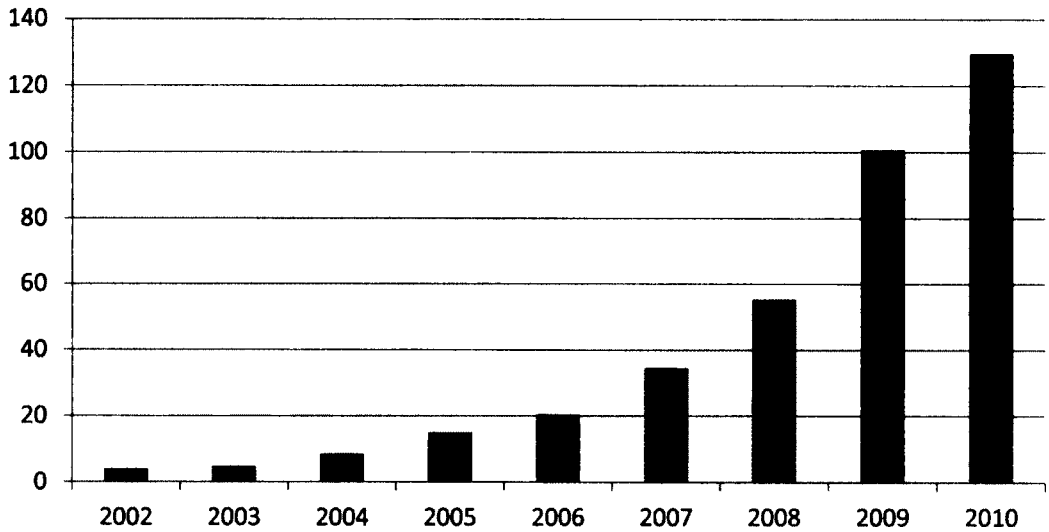
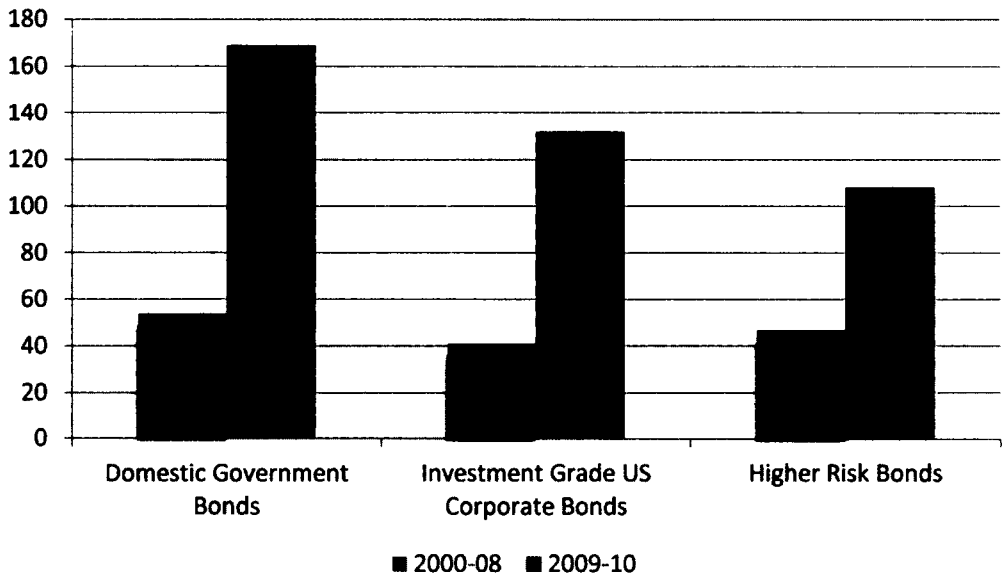


Figure 3.3. Total investments in fixed income securities by category 2000-2010

This chart plots the investments (in billions) in domestic government bonds, investment grade U.S. corporate bonds and higher risk bonds, comparing the total investments in each category for the nine year period of 2000 - 2008 to the two year period 2009-2010. The domestic government bonds category includes U.S. Treasuries, mortgage backed securities and municipal bonds. The higher risk bond category includes foreign and high yield corporate (junk) bonds. Data reported by the Investment Company Institute.



APPENDIX

Appendix 3.1. U.S. listed BOND (fixed income) ETF's as of December 31, 2010

ABFXF:US	ABF Pan Asia Bond Index Fund
CLFMF:US	Claymore 1-5 Year Laddered Government Bond ETF
XUBDX:US	Claymore/Dorchester - The Capital Markets Bond Index ETF
UBD:US	Claymore/Dorchester - The Capital Markets Bond Index ETF
XULQX:US	Claymore/Dorchester Micro-Term Fixed Income ETF
ULQ:US	Claymore/Dorchester Micro-Term Fixed Income ETF
UEM:US	Claymore/Dorchester US 1 - The Capital Markets Index ETF
XUEMX:US	Claymore/Dorchester US 1 - The Capital Markets Index ETF
TYO:US	Direxion Daily 10 Year Treasury Bear 3X
TYD:US	Direxion Daily 10 Year Treasury Bull 3X
TMV:US	Direxion Daily 30 Year Treasury Bear 3X
TMF:US	Direxion Daily 30 Year Treasury Bull 3X
SMB:US	Market Vectors - Barclays AMT-Free Short Municipal ETF
ITM:US	Market Vectors Lehman Brothers AMT-Free Intermediate Municipal ETF
MLN:US	Market Vectors Lehman Brothers AMT-Free Long Municipal Index ETF
HYD:US	Market Vectors High Yield Municipal Index ETF
PRB:US	Market Vectors Pre-Refunded Municipal Index ETF
TUZ:US	PIMCO 1-3 Year U.S. Treasury Index Fund
STPZ:US	PIMCO 1-5 Year US TIPS Index Fund
LTPZ:US	PIMCO 15+ Year US TIPS Index Fund
ZROZ:US	PIMCO 25+ Year Zero Coupon US Treasury Index Fund
FIVZ:US	PIMCO 3-7 Year US Treasury Index Fund
TENZ:US	PIMCO 7-15 Year US Treasury Index Fund
TIPZ:US	PIMCO Broad US TIPS Index Fund
MINT:US	PIMCO Enhanced Short Maturity Strategy Fund
MUNI:US	PIMCO Intermediate Municipal Bond Strategy Fund
PLW:US	PowerShares 1-30 Laddered Treasury Portfolio
PLK:US	PowerShares Active Low Duration Portfolio
BAB:US	PowerShares Build America Bond Portfolio
PCY:US	PowerShares Emerging Markets Sovereign Debt Portfolio
PHB:US	PowerShares High Yield Corporate Bond Portfolio
PWZ:US	PowerShares Insured California Municipal Bond Portfolio
PZA:US	PowerShares Insured National Municipal Bond Portfolio
PZT:US	PowerShares Insured New York Municipal Bond Portfolio
PVI:US	PowerShares VRDO Tax Free Weekly Portfolio
TBF:US	ProShares Short 20+ Year Treasury
TBT:US	ProShares UltraShort 20+ Year Treasury
PST:US	ProShares UltraShort Lehman 7-10 Year Treasury
BIL:US	SPDR Barclays Capital 1-3 Month T-Bill ETF
LAG:US	SPDR Barclays Capital Aggregate Bond ETF
CXA:US	SPDR Barclays Capital California Municipal Bond ETF
CWB:US	SPDR Barclays Capital Convertible Bond ETF

JNK:US	**SPDR Barclays Capital High Yield Bond ETF**
ITR:US	**SPDR Barclays Capital Intermediate Term Credit Bond ETF**
ITE:US	**SPDR Barclays Capital Intermediate Term Treasury ETF**
BWX:US	**SPDR Barclays Capital International Treasury Bond ETF**
LWC:US	**SPDR Barclays Capital Long Term Credit Bond ETF**
TLO:US	**SPDR Barclays Capital Long Term Treasury ETF**
MBG:US	**SPDR Barclays Capital Mortgage Backed Bond ETF**
TFI:US	**SPDR Barclays Capital Municipal Bond ETF**
INY:US	**SPDR Barclays Capital New York Municipal Bond ETF**
BWZ:US	**SPDR Barclays Capital Short Term International Treasury Bond ETF**
SHM:US	**SPDR Barclays Capital Short Term Municipal Bond ETF**
IPE:US	**SPDR Barclays Capital TIPS ETF**
WIP:US	**SPDR DB International Government Inflation-Protected Bond ETF**
VRD:US	**SPDR S&P VRDO Municipal Bond ETF**
EDV:US	**Vanguard Extended Duration Treasury ETF**
BIV:US	**Vanguard Intermediate-Term Bond ETF**
VCIT:US	**Vanguard Intermediate-Term Corporate Bond ETF**
VGIT:US	**Vanguard Intermediate-Term Government Bond ETF**
BLV:US	**Vanguard Long-Term Bond ETF**
VCLT:US	**Vanguard Long-Term Corporate Bond ETF**
VGLT:US	**Vanguard Long-Term Government Bond ETF**
VMBS:US	**Vanguard Mortgage-Backed Securities ETF**
BSV:US	**Vanguard Short-Term Bond ETF**
VCSH:US	**Vanguard Short-Term Corporate Bond ETF**
VGSH:US	**Vanguard Short-Term Government Bond ETF**
BND:US	**Vanguard Total Bond Market ETF**
USY:US	**WisdomTree US Short Term Government Income Fund**
ISRPF:US	**iShares - iShares $ Corporate Bond**
CSJ:US	**iShares Barclays 1-3 Year Credit Bond Fund**
SHY:US	**iShares Barclays 1-3 Year Treasury Bond Fund**
TLH:US	**iShares Barclays 10-20 Year Treasury Bond Fund**
TLT:US	**iShares Barclays 20+ Year Treasury Bond Fund**
IEI:US	**iShares Barclays 3-7 Year Treasury Bond Fund**
IEF:US	**iShares Barclays 7-10 Year Treasury Bond Fund**
AGZ:US	**iShares Barclays Agency Bond Fund**
AGG:US	**iShares Barclays Aggregate Bond Fund**
CFT:US	**iShares Barclays Credit Bond Fund**
GBF:US	**iShares Barclays Government/Credit Bond Fund**
CIU:US	**iShares Barclays Intermediate Credit Bond Fund**
GVI:US	**iShares Barclays Intermediate Government/Credit Bond Fund**
MBB:US	**iShares Barclays MBS Bond Fund**
SHV:US	**iShares Barclays Short Treasury Bond Fund**
TIP:US	**iShares Barclays TIPS Bond Fund**
ISDXF:US	**iShares CDN DEX All Corporate Bond Index Fund**
ISHXF:US	**iShares CDN DEX All Government Bond Index Fund**

INITF:US	**iShares CDN DEX Short Term Bond Index Fund**
EMB:US	**iShares JPMorgan USD Emerging Markets Bond Fund**
NYF:US	**iShares S&P AMT-Free Municipal Bond Fund**
CMF:US	**iShares S&P California AMT-Free Municipal Bond Fund**
MUB:US	**iShares S&P National Municipal Bond Fund**
SUB:US	**iShares S&P Short Term National AMT-Free Municipal Bond Fund**
ISHG:US	**iShares S&P/Citigroup 1-3 Year International Treasury Bond Fund**
IGOV:US	**iShares S&P/Citigroup International Treasury Bond Fund**
HYG:US	**iShares iBoxx $ High Yield Corporate Bond Fund**

VITA

Charles DuVal received his Ph.D. in finance from Old Dominion University in 2012, his M.B.A. degree (with honors) from the College of William and Mary in 2009, and B.S. from Christopher Newport University in 1979. His primary research interests include Real Estate, behavioral finance and asset pricing . After his undergraduate work, Charles spent seven years as a stock broker specializing in tax advantaged investments and mainframe computer sales to financial institutions. He has been self employed since 1985 owning Real Estate residential and commercial brokerage firms, as well as other companies involved with syndicating real estate investment, development, construction, management and related services. He is currently an assistant professor of finance at Florida Southern College in Lakeland, Florida.